

COAL AGE

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Not Being Sure, Be Careful

STATIC electrical charges of rather high voltage are sometimes generated by leaks in steam and air lines. These charges are equalized by sparks jumping from the charged cloud of steam or atmosphere near the leak. Such discharges or so-called sparks may be several inches in length and even though of static origin conceivably might ignite an explosive mixture of gas and air. We are not too sure yet that no static discharges or mechanical sparks will ignite methane, and it is well still to act cautiously lest in a gassy mine, where compressed air or steam is used to the exclusion of all electricity, fire, or explosions may be caused by steam or air leaks. There is only one reasonably safe procedure: Do not allow an accumulation of gas in any place at any time.

Better Mines, the Only Hope

WITH the proposed issue of the Dominion Coal Co. of \$15,000,000 in securities, and with the visit of George S. Rice to the mines of the company, the public is assured that the British Empire Steel Corporation does not intend to have its subsidiary meet the present low prices with inaction. Some companies have done this. One cannot commend their action. Most of them are up and doing, realizing that coal mining is not going to continue in the old rut but is going to have a renaissance.

We are unwilling to admit that coal mining is an unprogressive industry. It has made wonderful progress in recent years, but the next decade is going to see an accelerated movement, and those that lag behind soon will have to drop out of the race. The walk is going to change to a dog trot and the dog trot to a run in the next few years. The railroad industry is merely becoming more efficient, but the coal operator is not only handling recent equipment more effectively but is reaching out for new methods. Some are sending men to Europe to see what the mines of that continent may afford.

Canadian Competition

DESPITE the newness of Canadian coal enterprises—excluding in this reference those of Nova Scotia and perhaps Vancouver Island—the nearness of the seams to the surface, the opportunity to select which bed to work and which to reject, the price of coal at the mine is not low in Canada. Alberta coal, which Mr. Geddes in a recent issue deplored was not driving out coal from the United States, sold at the mine in 1922 and 1923 for an average price of \$4.07 and \$4.12, respectively. It would seem that the Albertans with their exceptional coal beds might blame themselves

rather than the railroads for any failure to drive out competing coals.

The Nova Scotia field is old and has extremely difficult circumstances to overcome, and that may explain why in 1922 and again in 1923 it realized an average of \$4.42 for its coal. New Brunswick received \$3.75 and \$3.90, respectively. Another section with great difficulties is British Columbia, its average price being \$5 and \$4.98. The Yukon price in 1922 was \$10 for its small production. Only Saskatchewan, with its lignite field, has low prices. It realized \$2.10 in 1922, and \$2.09 in 1923. The prices in the United States for bituminous coal in these years were \$3.02 and \$2.85. They have dropped since that time to \$2, as *Coal Age* price index shows.

The hope for Alberta and the other provinces of Canada is in more machinery, larger tonnage per plant and per day, and simplification of operation. Neither in politics, polemics nor in feverish recriminations but in industrial efficiency lies the real future of Canada.

One Meaning for Every Word

ELECTRICAL engineers have a well-defined, exact nomenclature for their industry. No one has any doubt as to what the words used by an electrical engineer mean, provided one knows the technique of the industry. This favorable situation has not happened by chance. The technicians have met together and decided on the meaning of certain words.

The result is not wholly fortunate. The words are exact but there are no synonymns, with the result that good electrical literature is somewhat bald, and repetitions of the same word are inevitable. Moreover, it does not improve with time. We still use such awkward expressions as "alternating current" where we might use some abbreviated form without descending to the use of initials.

Furthermore, electrical engineers in general use awkward verbs. A motor "burns up" or "out" rather than "burns." Why it should "burn up" or "out" no one knows. There is nothing particularly upward or outward in the burning. It may burn down or in, but the engineer insists on the motor burning the other way whether or no.

Nevertheless the standardization of the words the electrician uses is of great help toward a comprehension of his meaning, and it would be well if the mining industry were to attempt a similar standard, drawing from its wealth of words liberally so as to use them all, simply limiting their meaning. Then we would have synonymns that would make the language flexible. We could draw from all our mining regions, from all those of England, Scotland and Wales, perhaps also from those of France, Germany and Mexico, and get a well-rounded nomenclature that could be written fluently.

If need be a few words could be invented to suit modern needs.

Our glossaries are of little use. They tell us all the corrupt usages of mining terms and do not indicate any preference in favor of one or the other usage. We need authority back of our technical dictionary—arbitrary authority if necessary. Then we would know just what is considered the best usage and cease to use the words for other purposes. Thus "gob" is used to express a place where the coal has been extracted and filled with refuse or a place which might be so filled without detriment, if room were needed for such refuse, but we use it also to express a place where the coal, wholly or partly, has been removed so that the roof has fallen or may be expected or desired shortly to fall. It does not include places where the coal has been extracted and in which it is desirable to keep rock from falling or being stowed. To express the place where the roof has fallen or may be expected to fall the English use "goaf" and where it has fallen the words "the broken." It would seem well to adopt "goaf" and to distinguish it from "gob," but there are other definitions that should be determined that are even more important than these. We only half know a science the definitions of which are contradictory and uncertain.

Glamor from the Past

OUTSIDE the anthracite region how little has been written about the history of the coal industry! H. H. Stoek gave us a little about the Illinois field; something has been done, but meagerly, for Iowa; a little is vouchsafed about the Georges Creek field, Muhlenberg County in western Kentucky, the Hocking Valley and one or more other districts; but a complete history of American coal mining has yet to be written.

The anthracite region has been unusually fortunate. It contains some companies so old that they reach back to the early days. These companies have kept the story before the public, and, strange to say, those who would analyze the anthracite industry to its disadvantage usually have prefaced their remarks with a history of its development. In other sections no such close connection exists between the present and the past, and the work, if done, has been left to antiquarian societies.

Strange to say, no better way exists of reaching the public than through history. The public reveres its Lares and Penates, however questionable, and, truth to say, the original mine owners were respectable and respected. They were pioneers and builders. They were the "forty-niners" of the regions they developed. Around them can be weaved a romance; from them may be evolved a tradition.

Americans never speak ill of their forefathers. Enough of mystery surrounds the past that the names that survive are like the heroes of Greek mythology—supermen. Hence if we would have the public pay the industry the respect due to its importance and value, recall not so much our present-day leaders in mining as those that, being shrouded in antiquity, can be glossed with all the glories of the imagination. Back in past years were men whose ways were dubious. There are railroad men whose actions were questionable, more than questionable—in fine they were rascals—but the hand of time has dealt kindly with them. We

note now only their courage, their foresight, their energy and resourcefulness. The rest is quite generally forgiven, forgotten.

With these exemplars the coal industry does ill to pass over its pioneers. Through them, though they may not have been better than the general run of their enterprising neighbors in other industries, may be found a way to the hearts of the public. They are not less noble than those of our ancestors that burned what they chose to call "witches," that ducked the scolds and persecuted those who disagreed with them. Those who trace their origin from these originals regard that fact as a merit. Surely the story of the pioneers of our industry might be recited to give the public a sense that the mining of coal is "an ancient and honorable" industry, in the development of which the public might take a kindly and not an antagonistic interest.

Then also should we keep the history of the mechanical developments in coal mining. Just at present it is customary to speak of them with disrespect, but surely the story of mining is a record of achievement, no matter what is said. After all, in our transportation methods we are not so remiss. Cars go twice and thrice, even four or more times, to the working face every working day, under conditions of exceptional difficulty. The railroads would find it difficult to prove equal efficiency, even considering the greater distances to be traversed.

The past, of course, will not save the industry from censure. Our contemporaries are too wise to be hoodwinked, but with a goodly present and the glamor of the past we may attain the good word of the public, despite the fact that no one is kindly disposed toward any essential industry. The credit of an historic past cannot save us from the consequences of our faults but may spare us unjustifiable persecution.

Algebra First

HOW MANY first-class efforts to give helpful training of all kinds have been ruined by scholasticism. Many an attempt to give a man the results of experience has been sidetracked by the pedagogs who can see nothing but algebra, geometry and the relation between these studies and pneumatics, chemistry, hydraulics and what not. Industrial education has drifted so far in the wrong direction that the pupil has been discouraged or has been led finally to believe that according to his mathematical ability will his fitness for a position be judged.

In our mine foremen's examinations, unfortunately, we have put geometry, rather than safety, first. Our calculating fiends have put cube and square root where accident prevention should rightly be. The rigorous tests as to a knowledge of safe shooting, safe haulage and safety from gas have taken a back seat. "Let no one enter who is unacquainted with algebra" is our dictum instead of "Safety first." We need mathematical ability in engineers and a knowledge of plain figuring and simple mensuration in mine foremen, but so much geometry and so little safety in our examination questions for mine foremen has made these tests a farce. Looking at these questions would you believe that the mine foreman was about to undertake a responsibility in which men's very lives hung in the balance?

There are two kinds of coal miners today: Non-working union and non-union working.

"The Hartshorns" Open Big Illinois Strip Pit

Careful Prospecting and Long Stripping Experience Utilized in Pit Layout—Except for One Shovel and Six Locomotives, Pit Will be Electrically Operated Throughout

BY E. W. DAVIDSON
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IN THESE desperate days of high mining cost and abyssmal market the lure of the strip pit is strong among coal men. If they could but strike a piece of perfect strip land and steadily produce a lucrative stream of "dollar a ton" coal that would sell as fast as it was loaded out, what bliss life would hold for them! But it is axiomatic that strip property is often more heavily deposited with heartbreak than with coal.

As a result, successful coal stripping largely remains in the hands of men who have learned the science of stripping, and, although many new pits are opening up this year—three huge ones in Illinois alone—the most promising among them are operated by veterans who know that a strip mine, to be an earner, must contain the right kind of coal and plenty of it, that its operating conditions must be good and that its output must be clean, for the day of selling "any old thing" to the public is definitely passed.

Such a pit is the new mine operated by the Black Servant Coal Co., at Elkhville, Ill., on the western edge of the great southern Illinois field. The Black Servant Coal Co. really means "the Hartshorns of Danville," a family whose experience has contributed materially to the development of the stripping art in this country.

STRIP PIT PROVIDED WITH FIVE-TRACK TIPPLE

The company has opened a 420-acre tract calculated to contain nearly five million tons of No. 6 blueband coal varying in thickness from 5 to 8 ft. under 20 to 45 ft. of cover. It also has an additional 600 acres under 45 to 70 ft. of cover with coal running up to 9 ft. in thickness. A five-track tippie has been built to prepare and load a maximum of 3,000 tons per day and production is now up to 2,000 tons a day. This plant bears many earmarks of an ideal stripping proposition. It has been working at least five days a week since last fall with few unbilled loads ever held over night—and this during a period when most of the deep mines of Illinois were either shut down or were getting two days a week of running time under a burden of "no bills."

Nobody knows better than the Hartshorns that there

is public prejudice against stripped coal. This prejudice has been created during past years when stripping was little more than a matter of ripping off some cover, running a string of railroad cars down into the pit and shoveling into them whatever coal was handy, along with any lumps of clay and shale that didn't get out of the way. Real preparation of strip coal—even washing in some regions—is more recent. But the prejudice still exists.

So the Black Servant Coal Co., following the trail that it and a handful of other big stripping concerns have blazed, set out at Elkhville to overcome a little of that prejudice by giving its output as careful a preparation as any strip pit product ever got, short of washing—a process considered unnecessary in this field.

Although there is a variation in the quality of the coal from section to section of the tract, due in part to the fact that a protecting stratum of limestone overlies only 60 to 70 acres of it, still, the whole coal bed is covered by 4 to 20 ft. of shale. As a result the sulphur impurities carried by ground

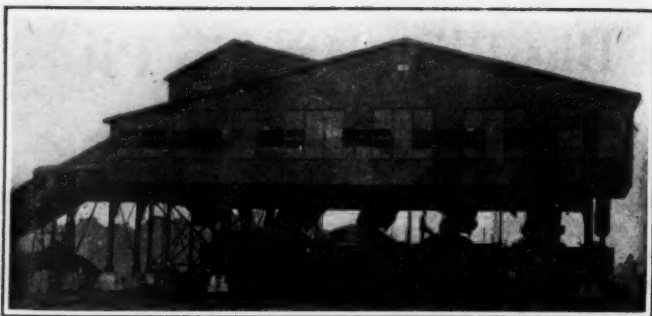
water have not raised the sulphur content of the coal to more than 3 per cent in any of the samples that have been tested. Analysis of four samples show heat values ranging from 11,500 to 12,233 B.t.u. per lb. The moisture content runs from 6.30 to 9.71 per cent, ash from 7.09 to 10.18 per cent and fixed carbon from 47.38 to 49.58 per cent. On such analyses as these, the coal is sold as a high-grade steam and good-quality domestic fuel.

More than twenty years ago the farmers of the region excavated a little of this coal for their own use at points near the outcrop of the measure. Geologic disturbances left the deposit so badly broken up, however, that there had never been any mining of consequence, in the bed nearer than the shaft mines at Dowell and Duquoin, two and eight miles respectively to the northeast, and at Hallidayboro, two miles to the southeast of Elkhville. The Hartshorns, with their Danville tracts exhausted, became interested in the region, however, and spent more than a year in prospecting it. Over 2,000 drill holes were sunk before 1,000 acres in two separate tracts were purchased in the winter and spring of 1922-1923.



Main Bottom at the Black Servant Strip Pit

Into this 50-ton hopper, feeding the hoist conveyor, ten-car trips from both sides of the mine deliver their loads. The track layout, when it is complete, will enable locomotives to dump their trips, three cars at a time, and proceed forward around a curve through a switch before they back their empties down into the works for reloading. Thus each side of the mine will have its own haulage operating unhampered by the other half of the mine.



Few Strip Pits Have Such Tipples as This

Five tracks, four of them provided with loading booms, together with efficient screening and picking arrangements, enable this tippie to furnish coal as carefully prepared as that coming from a shaft mine. Today the public is prejudiced against strip-pit coal. It is hoped that some of this aversion may be overcome by careful preparation.

In April, 1923, with the 420-acre tract thoroughly mapped, shovels started removing the cover. Tipple construction was begun at once. In November the first coal was loaded out, but without much preparation, for the tippie, designed and built by the Jeffrey Mfg. Co., was not put into operation until this spring. It was finally completed and accepted early in June. Only about two months more of development are required—granted a steady market—to get the stripping, loading and haulage systems lined up in their permanent form and the whole enterprise into full stride.

The tract to be stripped is, roughly, a mile and a quarter wide east and west, and half a mile deep north and south. A spur from the Illinois Central railroad skirts the northern edge of the pit as far as the tippie which stands a little east of center. The coal measure dips to this point and the loaded trips in the pit will have the advantage of an average 2 per cent grade, running down to a 50-ton dumping hopper. From that point a conveyor lifts the coal to the top of the tippie.

The working plan calls for stripping and loading on the advance through the property from north to south maintaining a cut in the form of a cross. Little or no coal will be lost. A thorough cut will be driven straight south from the main bottom, thus opening a permanent haulageway. A stripping and a loading shovel will work back and forth along each arm of the cross. The east and west workings thus are operated as independent units, each with its own haulage system. Three 20-ton steam locomotives are expected to operate in each unit. Each locomotive will handle nine or ten 6-ton cars per trip, moving the loads to the main center haulageway and thence northward to the dump hopper.

CARS WILL BE DUMPED THREE AT A TIME

The inner rail of each load track will be laid directly along the rim of the receiving hopper, into which the side-dump cars will discharge by threes. After dumping, the locomotive will push its trip of empties forward and around a curve laid close to the north bank of the pit. It then backs down the empty track past the dump hopper and onto the main line again for its run back to the loading shovel. Passing tracks at proper intervals will permit the steady operation of three such trips, for each half of the mine. The only double track will be that down the main center road so that there can be no interference between the two lines of haulage.

The two stripping shovels that are now in the mine will do most of the work of cover removal. They will be assisted, however, by a dragline with a 125-ft. boom

and a 3-yd. box. This machine will work ahead of the shovels on the thorough cuts, so as to move the spoil farther back than the big shovels can reach. One of the shovels is a 300-ton and the other a 350-ton machine. Each is fitted with an 8-yd. bucket and a 90-ft. boom. Of the two loaders mentioned earlier one is steam-operated and the other driven electrically. Both are mounted on caterpillar trucks. Each is equipped with a 2-yd. dipper and ordinarily loads two tons at a dip.

These machines load strips of coal 20 to 25 ft. wide, and the stripping shovels work behind them on berms at least 40 ft. wide, moving the spoil over into the place from which the coal has been removed. It is the effort, however, always to leave an open space in front of the coal face, so as to enable the loading shovel to remove coal with as little clay and other foreign matter mixed with it as possible.

The overburden is of such nature that the only cleaning of the coal bed necessary is done by two men with shovels and wire brooms. These men also lay track for the stripping machines. In parts of the mine already opened, the top of the coal is practically flat containing few pockets and dips such as require cleaning by hand. Throughout most of the work thus far performed, the track for the big shovels has been laid directly on the coal. Only occasionally has it been necessary to timber under the tracks. This simplifies track work to such a degree that two men comprise the entire track-laying crew for each stripper.

SHOOTING RAILS FORWARD UNDER SHOVEL

One further detail helps to simplify the work of the tracklayers. This is the use of two sections of roller conveyor as long as the shovel frame and suspended under the machines close to the ground. On these the short, heavy sections of rail at the rear of the shovel can be shot to the front whenever the shovel is ready to travel. This saves the time and labor necessary to carry the rails around by hand.

In parts of the pit the work of the stripping shovels is heavy not only because the cover in places runs as deep as 70 ft., but because of the presence in certain localities of heavy lime rock above the coal. Shots are placed in this stratum of sufficient strength to break it up fairly well. Churn drills working on the top of the bank, back from the cut, also put down holes on 20-ft. centers. These are used to shoot up the shale which rests immediately on the coal.

Where the proportion of rock in the spoil is great, one difficulty encountered in this stripping is avoided, for this rock reduces the tendency of the spoil bank to slide. The soil of the overburden is extremely slippery when wet. Because of this fact, throughout the early work in this pit, slides were frequent, covering up the coal face and causing trouble generally.

After several such occurrences the mine operators struck upon a way to put this slipperiness of the spoil to good use. If moisture would make the front of the spoil bank mobile, coasting dirt down into the cut, why would it not coast dirt down the other side as well? Accordingly a water line was run to the rear side of the bank on which each stripper was dumping spoil. A man was placed at this point with instructions to sluice down the rear slope so that each dipperful of dirt would skid to as distant a stopping place as possible. This expedient helped move back the weight of each waste bank and prevented the loss of much time and obviated

much plain and fancy "cussing" down in the workings proper.

Thus far, drainage in this strip pit has not been difficult. Lines of tile leading to the nearest pumping sump are laid under the advancing spoil banks. From the sumps the water is pumped out over the rim of the pit and discharged into convenient gulleys. Up to the present, nine comparatively small centrifugal pumps—one 8-in., four 4-in. and four 2-in.—have done all the work of draining the pit and have been used only periodically, thanks to the fact that the natural contour of the property drains both ways from a low divide running across the tract. A system of 4-ft. ditches encircling the entire pit also helps. Practically no surface water runs into the mine. Ground water and that which rains into the open workings is about all with which the pumps have to contend. The pit has never had to stop work on account of a flood—that bane of the average strip mine.

The mine is electrified throughout except for one of the small loading shovels and the haulage locomotives. Central-station power is delivered from a 33,000-volt line and is stepped down to 4,200 volts in the power company's substation on the property. Thence it goes to the coal company's combination switch house and electrical repair shop which contains the main oil circuit breaker and the metering equipment. One feeder line runs to a separate substation where the current for the tippie is stepped down to 440 volts and where oil-switch protection against overload helps to make the tippie power supply uninterrupted. An underground cable extends from the tippie substation to a central control "pulpit" from which all the motors in the building are started and stopped.

Other feeder lines run into the pit to serve the shovels, the pumps and the compressors that furnish air to the coal drills. Great care is exercised in taking this 4,200-volt power into the pit. Two miles of 3-phase line is built around the rim of the workings that are now active. Those lines that run along the north edge and the east and west ends of the property are carried on poles and the construction is permanent. The cross

line spanning the property on the south side of the workings will be moved southward from time to time to keep pace with the advancing face. It is always to be maintained at a considerable distance, at present 1,500 ft., back from the rim. Laterals tapping it at 1,000-ft. intervals extend northward toward the rim of the cut to supply the lines that actually run into the workings.

Two of these laterals are carried directly to the two big stripping shovels which require the full 4,200-volt current. Everything else in the pit operates on a potential of 440-volts. Portable substations, brought up close to the rim of the cut—but for safety's sake, not down into the pit—supply the loading shovels, the pumps and the compressors with 440-volt "juice." A safeguard against electrical accidents in the mine is provided through the use of a metallic neutral carried on all lines of consumption. By all these precautions in line building and protection the possibilities of accident are greatly reduced. Thus far no injury from electrical shock has been suffered by any employee.

COAL PRODUCED RECEIVES EXCELLENT PREPARATION

The five-track tippie is completely equipped to prepare and load mine run, 1½-in. screenings, 2 x 1½-in. nut, 3 x 2-in. nut, 3 x 6-in. egg, and 6-in. lump or any combination of these sizes. All grades above 1½-in. screenings can be delivered to a 400-ton-per-hour single-roll crusher. Of late much crushing has been done. The flexibility of the tippie equipment is noteworthy.

Coal is delivered from the big hopper on the main bottom of the pit to the tippie by means of a 48-in. steel-pan conveyor operated by a 100-hp. slip-ring motor taking 440 volts alternating current as do all the other motors in the tippie. The extra-long shaker screens have two cranks driven by a 40-hp. induction motor.

The over-all length of the shaker screens is 72 ft., and their width is 7 ft. There are 16 ft. of 1½-in., 14 ft. of 2-in., 12 ft. of 3-in. and 10 ft. of 6-in. perforations. In addition there are three more feet of 1½-in. perforations in a degradation screen set into the chute under



East Wing of Mine

At this particular point there is about 5 ft. of coal under 35 ft. of cover. Development has not yet progressed sufficiently to furnish the normal output. Eventually the two working faces will form practically a straight line extending across the property from east to west. Haulage will be along either face and thence down the main haulway northward to the tippie bottom. Note the limestone ledge which is over much of the coal and has to be blasted individually. It has aided in keeping the coal below it in good condition.



West Wing of Pit Is Only Well Started

This is a view looking west across the main bottom where a trip is being dumped three cars at a time. The haulage locomotives and one shovel are the only machine in the whole plant that are not operated electrically.

the 2-in. screen and a short 2-in. degradation screen under the 3-in. discharge, thus making separation of the small sizes as complete as possible.

The screenings fall directly from the shaker into a hopper delivering to railroad cars. By the use of a fly-gate all the screenings can be delivered to a conveyor extending along one wall of the tipple and parallel to the railroad tracks. This discharges to a flight conveyor running across the front of the tipple just above the forward ends of all the loading booms. This is the assembly or mixing conveyor.

The lower run of this mixing conveyor moves from the screenings side of the tipple to the lump side. Thus the screenings can be delivered alone by a drop gate and chute into any car on the five tracks or they can be mixed with any other size being loaded. Any of the other sizes can be cross-hauled by this mixing conveyor by the simple expedient of lifting the end of any loading boom so that it will deliver onto either the top or the lower run of the mixing conveyor, depending upon which direction the coal is to move. The upper run delivers to the crusher.

LARGER COAL SIZES ARE THOROUGHLY PICKED

Between the shaker screen and the loading booms are ample picking tables, each 26 ft. long. It is customary to employ 11 pickers. Four work on the lump table, four on egg, two on the 3 x 2-in. nut and one on the

2-in. nut. A refuse conveyor moves the pickings back toward the pit delivering them into a hopper from which trips can be loaded so that this material can be hauled back and dumped into areas from which the coal has been removed.

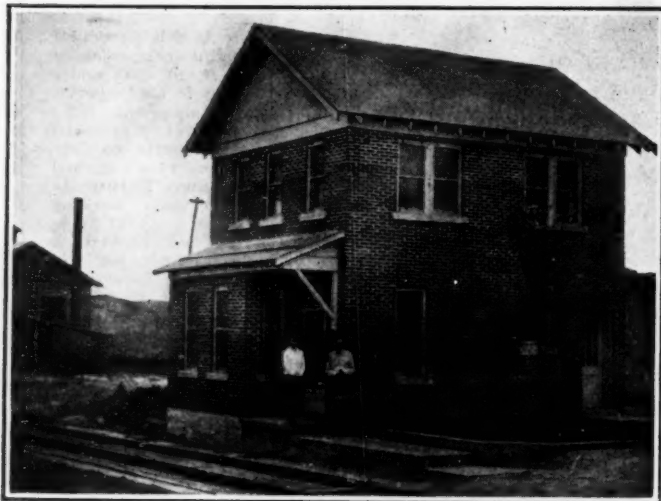
Railroad cars are moved by gravity from the point where they are delivered in the empty yard over a 2 per cent hump above the tipple until they have been lowered across an automatic recording scale into the flat-grade load-storage yard below. A caterpillar tractor has proved handy around the tipple for occasionally moving cars against the grade and forms the coal company's nearest approach to a switch engine. It was a highly useful piece of apparatus around the works during the early development stages. It moved everything that needed moving and did it with precision, neatness and dispatch.

The coal company has built a two-story brick office building and weigh house and a small bath house 150 yd. east of the tipple. Seldom are such substantial buildings seen around a strip pit.

The shop building is a 50 x 90-ft. steel structure and houses a most complete set of mine-shop equipment and a crew of mechanics. These latter under the direction of C. W. Norman, who is in charge of all top work, can do practically all the repairs that will ordinarily be necessary in the mine. They can do heavy forging on steel such as is used on the shovels, they can manufacture all the switches, frogs and steel ties the company uses. In fact they are balked at little or nothing.

The equipment of the shop consists of a forge, a 500-lb. power hammer, a 300-ton hydraulic press, a 24-in. shaper, 24-in. and 26-in. drill presses, 13-in. and 54-in. lathes, two emery-wheel stands, a 6 x 9-in. high-speed, power hack saw, oxycetylene welding and cutting torches, an electric welding outfit, a small power-driven air compressor and an assortment of small tools. Traveling cranes aid in handling heavy work. A pit has been sunk in the floor and eventually a track from the workings will be run directly into the shop to facilitate locomotive repairs.

The staff at this mine consists of W. B. Reid, general superintendent; Otto Ullom, field boss; F. S. Burns, electrical engineer; C. W. Norman, top boss; Henry Meyer, shovel boss, and E. H. Elder, chief engineer.



Black Servant Buildings Are Permanent

In the foreground is the main office and scale-house building while in the left background appears a portion of the wash house. Both have been built with the idea that they should last throughout the life of the property. Strip-mine buildings are seldom made as permanent as these.

Accident Rate at Coke Ovens Falls

Accidents in the coke-oven industry of the United States in the year 1923 killed 45 employees and injured 2,593, according to statistics compiled by the Bureau of Mines. Coke manufacturers employed during the year 23,729 men, a larger number than was employed either in 1921 or 1922. The accident rate for the industry was the lowest in 10 years, with the exception of the years 1915 and 1922. The reduction, however, was confined to accidents of a nonfatal character, as the fatality rate increased slightly as compared with the two preceding years. The accident rate for the year, based on 1,000 full-time, or 300-day workers, was 102.94, of which 1.76 represented the fatalities and 101.18 the nonfatal injuries. The fatality and injury rates for the year 1912 were 1.59 and 93.77, respectively, and those for the 5-year period 1916-1920 averaged 1.81 and 167.03. Comparing the rates for 1923 with those for the 5-year period, the fatality rate in 1923 represents a reduction of 3 per cent and the injury rate a reduction of 39 per cent.

Recovery Work After the Castlegate Mine Disaster

What It Taught and Exemplified*

Typical Example of Organization and Recovery — Treatment of Bodies — Establishment of Ventilation — Testing of Apparatus Before Use — Inspection of Men on the Rescue Teams

BY A. L. MURRAY

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RECOVERY of the Castlegate No. 2 mine at Castlegate, Utah, following the explosion of March 8, forms an excellent example of the organization that must be perfected and the procedure that is usually followed in the recovery of any large mine after a major disaster. Although each such occurrence has its own peculiarities, in which respect the one at Castlegate was no exception, yet the operations conducted after that explosion were of the type followed in recovery work in general.

The explosion in this mine occurred shortly after 8 o'clock on the morning of the date above mentioned. The day force had been underground only a short time, and the small night force had not yet left the operations. Every man underground at the time of the explosion—there were 171 in all—was killed.

On the morning of the disaster, the Utah Fuel Co., which had temporarily closed down its No. 1 operation replaced a number of the single men previously employed in No. 2 mine with older employees and married men from No. 1. This accounted in large measure for the large number of married men who lost their lives.

Immediately following the explosion, a call for rescue crews was sent out from the mine office to all coal-mining operations in the district. Within two hours teams from nearby camps were on the scene fitted with oxygen apparatus and ready to enter the mine. By afternoon more men were present than could be utilized at that stage in the recovery work. In all twenty-one apparatus teams took part in the work of exploration and recovery. They embraced six teams with the Paul and fifteen teams equipped with the Gibbs type apparatus. Both types gave excellent satisfaction.

The fact that twenty-one mine-rescue crews, all composed of trained men and provided with apparatus more than sufficient to equip them, could be assembled in less than twenty-four hours is a credit to the coal-mining companies of Carbon and Emery Counties, Utah. It also forms concrete evidence of the value and effectiveness of the training given apparatus crews by the Bureau of Mines. As these rescue teams reported for work they were grouped into three shifts, each consisting of seven apparatus crews.

Inasmuch as the change house adjacent to the main

mine portal was large, steam-heated and had an adequate supply of both hot and cold water it was selected as the apparatus base. Here all machines were cared for, recharged with oxygen, supplied with fresh regenerators and given a thorough test before being put to use underground. Suitable work benches were installed at one end of the change house, and experienced men assigned to the work of testing and recharging the apparatus. An adequate supply of spare parts furnished from the surplus of the various companies which had teams present was kept on hand at all times.

From a preliminary survey of the conditions existing after the explosion, it was ascertained that roof falls and debris blocked the main portal of the mine. Accordingly, it was decided that an escapeway located about a quarter of a mile

up the canyon offered the best means of ingress and egress for exploration and recovery work. This opening was comparatively free from obstructions.

The general working schedule for the apparatus teams on each of the three 8-hr. shifts was as follows: Two teams were actively engaged in exploration and recovery work underground for a period of two hours, the actual time under oxygen varying from one hour to the full period. Two teams were held in support at the entrance of the escapeway ready to relieve the men underground at the end of their turn and also prepared to respond in case of emergency. The teams in support were housed in heated tents. The remaining three teams held in reserve rested at the change house.

MOVE UP PAIRS OF TEAMS EVERY TWO HOURS

As the active teams completed their tour of duty underground, they returned to the change house to rest. Those in support took their place in the mine and two teams that had been resting at the change house moved up in support. Thus one team, the seventh on the shift, was available for any special exploration work or for replacements or as supernumeraries in case any member of the other teams became incapacitated. All teams, together with their apparatus, were transported from the change house to the escapeway and back by auto buses.

Each crew of apparatus men was supported by fresh-air crews—men who did not wear apparatus and worked only in sections of the mine where ventilation had been re-established. These men transported materials and

LEST DISEASE FOLLOW DISASTER

SPECIAL care was taken to avoid infection from dead bodies, the men who handled them being provided ultimately with heavy rubber gloves of the type used by electricians. Their hands were carefully disinfected when they came off shift. The disinfection of apparatus mouthpieces which were used by different men on different shifts was given most careful attention. The bodies of animals found dead in the mines were treated with quicklime.

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supplies to the apparatus crews, and received the bodies brought out by the rescue teams and carried them to the surface.

Each shift was under the direction and supervision of three experienced men selected from the mine superintendents, engineers and mine foremen of the various mines in the district. One of these supervisors directed the work at the apparatus base, one that at the mouth of the escapeway and one the operations underground. Although this distribution of the work formed the general plan of direction, in many instances the underground supervision was augmented by advisory members made up of the general manager, general superintendent and chief engineer of the Utah Fuel Co., the general superintendent and chief engineer of the United States Fuel Co., the chief mine inspector and the coal-mine inspector of Utah, and mining engineers from the federal Bureau of Mines.

As soon as possible after the explosion, the ventilating fan was placed in operation exhausting. This machine had not been damaged but the controlling doors for reversal of the air current had been jammed by the force of the explosion coming out of the aircourse. A general plan for exploring and recovering the mine through the escapeway which connected with the main slope by the second left dip entry almost midway of the operation was adopted.

By this means, fresh air entering the escapeway could be carried forward by temporary stoppings. The apparatus crews kept in advance of the fresh air making explorations and constructing new stoppings to which points the fresh air was successively carried. In this way, the recovery work was advanced in safe stages, down the dips on the left, back up the dips on the right and then on up the raises until the entire mine had been reclaimed.

On several occasions progress was appreciably delayed by fires. These had to be dealt with when met and had to be completely extinguished before further progress could be made. As soon as any section of the mine was cleared of gas, by having fresh air turned into it, a patrol of two men was established whose duty it was during their shift constantly to traverse the section watching for evidence of fires and testing the air for explosive mixtures of gas. Each of these men carried a safety lamp and a canary. These birds, which form one of the most reliable means of testing for carbon monoxide, were extensively used in this work. Although about seventy were available, fifty having been shipped to the mine the day following the explosion, only about forty were actually used. Of the forty birds, the lives of about sixteen were sacrificed in order that the men might be amply protected.

One lesson learned from the use of canaries at Castlegate is that carrying cages should be provided with wooden bottoms. Several all-metal cages with bottoms unprotected were in use. In every instance the birds occupying these cages developed an affection of the legs resembling rheumatism. This probably resulted from the chilling of their feet when the cages were exposed

to continuous currents of cold intake air. Birds so affected would not use the perch, but would squat on the bottom of the cage. Birds in wooden cages were not affected in this manner.

Again, at least one side, or better two adjacent sides, of the cage should be closed to protect the birds. Canaries are highly sensitive to drafts, and cages with two solid sides will permit exposure of the birds to mine atmospheres yet afford some protection from currents of cold air. At the Castlegate disaster there were more than enough birds for all testing purposes, but in cases of a similar nature elsewhere the number available might be limited and the needless disability of only a few birds might seriously handicap exploration and recovery work and possibly endanger the lives of men entombed.

During the early stages of the recovery work, hope was entertained that some of the miners might be found alive. As work progressed, however, and evidence of the extent and severity of the explosive blasts accumulated, the chances of finding anybody or anything alive in the mine became fainter and fainter. Nevertheless, hope and effort were ever spurred by such a possibility.

Whenever the rescue teams in exploration work discovered a body, it was

placed on a stretcher and carried to the nearest fresh-air base. Here it was turned over to a fresh-air crew and brought to the surface. Many such bodies had to be carried more than three-quarters of a mile. The first body of the 171 men who lost their lives in this disaster was taken from the mine about 11:45 p.m. on the day of the disaster, and the last of the bodies were brought out on Thursday, March 18, at 4 p.m. Work of recovering bodies was pushed as rapidly as was consistent with safety. But, as previously mentioned, fires greatly delayed operations. These had to be controlled and extinguished before further progress could be attempted.

Medical organization under the direction of Dr. McDermit, the camp surgeon, consisted of one physician at the morgue, one at the local hospital, two on 12-hr. shifts at the apparatus base and six on 8-hr. shifts at the escapeway opening. The duties of these men were as follows: The physician at the morgue was Dr. McDermit, who was acquainted with most of the men at the mine as well as with their families. He completed identification of bodies where doubt existed, saw to the issuance of death certificates and burial or shipping permits.

The physician at the hospital cared for patients sent there and looked after the general medical welfare of the camp. Those stationed at the apparatus base examined members of the various teams before they went on shift, supervised the disinfection of apparatus mouthpieces and their covering with sterile gauze while awaiting use, the disinfection of hands of members of teams as they came off shift and the caring for and dressing of cuts, bruises and abrasions so as to prevent possibility of infections.

The reason for exercising so much care on the disin-

DANGERS OF DOING ONE'S UTMOST

IN the recovery work, strain completely unnerved one apparatus man, and when his nose clip was brushed off he fought with his team mates and was brought to the surface still struggling. Unfortunately the captain's nose clip was dislodged in the struggle. When found he was already dead. It is believed his fatigue prevented him from making necessary adjustments. Later the work was better organized and none was allowed to do more than he could safely perform.

fection and protection of apparatus mouthpieces will be realized when the large number of men using apparatus is considered and when it is remembered that the same apparatus was not worn by the same man on the various shifts. Careful disinfection of the hands of the team members as they came of shift, as well as the protection by proper dressing of bruises, abrasions and cuts was necessary in order to protect the men from the results of a possible infection incurred while handling bodies in the mine.

IDENTIFICATION OF BODIES EXTREMELY CAREFUL

The physicians stationed at the escapeway received and examined all bodies removed from the mine with a view to aiding in their identification through mine checks, clothing, articles found in the clothing or peculiar body marks. For each body removed careful notes were made as to place of recovery and anything found about or on the body that could in any way aid in identification. These doctors were equipped also with necessary materials to care for any injury received by the men when in the mine. The physicians who assisted in the work at this disaster, aside from two from the Utah Fuel Co., were mainly those from surrounding towns and coal operations, as well as myself.

The Knights of Pythias Hall at Castlegate was turned over for use as a morgue and corps of sixteen undertakers was on duty constantly. In addition to these, the various Carbon County Posts of the American Legion kept a large number of men at the morgue to assist in handling the bodies and preparing them for burial. As rapidly as bodies were positively identified, prepared for interment and placed in caskets, they were removed to the Community Hall nearby.

ANIMAL CARCASSES TREATED WITH CHEMICALS

In addition to the 171 men, nineteen horses and mules were killed underground. No attempt was made to remove the putrid carcasses of these animals. Whenever one was discovered, chloride of lime was sprinkled over it and later, men in apparatus chopped open the abdominal and chest cavities, placing quick lime therein as well as over the entire carcass. By the action of this material through the absorption of body fluids, such carcasses were reduced eventually to dry flesh, skin and bone which could be removed later with little difficulty.

For the comfort of the men engaged in recovery work, the company maintained two canteens where hot coffee, sandwiches, fruit and tobacco were kept on hand at all times for free distribution. One of these canteens was placed near the apparatus base in the change house and the other near the escapeway. In addition to these comforts, the company also supplied both rescue crews and fresh-air men with the necessary changes of overalls, jumpers, socks, underwear, shoes and cotton gloves. During the later stages of the recovery work, electrician's rubber-faced gloves of a heavy type were furnished the crews which handled bodies.

From all the evidence obtainable, it is believed that death was instantaneous in every case. This was evident from the positions and attitudes in which the bodies were found, not a man having moved from the place occupied at the time of the first blast except, of course, those thrown an appreciable distance by the violence of the explosion. Not a single instance could be found where it was indicated that a man had

struggled or made any attempt to protect or save himself. A careful examination of the bodies showed carbon-monoxide saturation of the blood which, except for the few men who undoubtedly were killed instantly by direct violence from the initial blast, was the accepted cause of death.

Examination of the mine showed that the violence of the explosion varied in different sections, in some places being extreme and in others comparatively slight. Regardless of the violence shown in any given section, however, it is believed by those who made a careful examination that the initial explosions were of sufficient intensity to deplete most of the mine air of its oxygen and that the carbon-monoxide content of the afterdamp which quickly spread to every part of the mine except possibly the face workings at the top of the raises, was so high that no living thing could have survived it more than 30 sec. The thick bed of coal worked in this operation, the straight continuous main slope extending throughout the entire length of the mine and the numerous crosscuts no doubt appreciably aided in flooding the mine with afterdamp.

EVERYBODY BURNED BUT SOME AFTER DEATH

Burns were evident on everybody removed from the mine. Naturally, these were most severe on the exposed parts, such as the hands and faces, and in most instances these presented a complete charring of the surfaces, into which had been driven fine pieces of coked coal. On those bodies where the clothing had not been torn or burned away (the majority were found fully clothed), areas giving every evidence of burns from dry heat were found. All this burning apparently occurred after death, as no evidence was discovered of blistering or an inflammatory area surrounding the burns. This further strengthens the supposition that death in practically every case was due to carbon-monoxide poisoning. Severe burning of the face of nearly every one of the bodies necessitated care in noting the places where the bodies were found, and rendered it important to make a careful search of the clothing as well as an examination for peculiar body marks for purposes of identification.

COKED COAL DRIVEN INTO BURNED SURFACES

Small pieces of coked coal driven into the burned surfaces gives fair evidence that most of the burns were caused after death by the final dust explosion which was characterized by longer and more intense flame and by the formation of coke dust.

The apparatus crews worked a total of 121 shifts, or an average of 6 shifts each. Total rescue-apparatus hours amounted to 3,840 and only one serious accident was recorded during the time that work was in progress.

During the afternoon of the day on which the explosion occurred several men working in the open air on a fall of rock at the portal of the main opening, at least 20 ft. from the mine mouth, were overcome by gases issuing from the workings. At least eight hours had elapsed since the last explosion and much fresh air had been entering the mine meanwhile through the escapeway, yet the monoxide content of the mine air was sufficient to cause these men 20 ft. outside of the workings to be overcome. All of these men made a quick recovery when removed beyond reach of the fumes and given a short period of oxygen inhalation.

One highly unfortunate accident was the death of

a member of one of the rescue crews. During the first afternoon one of the teams from Spring Canyon, which had already made four exploratory trips into the mine, was on its fifth trip about 1,300 ft. in at a point where the going was difficult. One of the crew in passing another brushed off his nose clip. The man whose nose clip was thus removed became panicky, requiring considerable effort on the part of the balance of the crew to control him. With his nose clip replaced, he was being brought to the surface still struggling and wrestling. In attempting to keep the man quiet the captain had his own nose clip knocked off and possibly his mouthpiece dislodged.

At this time the team was still several hundred feet from the mine opening. The captain stopped, evidently to replace his nose clip, while the remaining members of the team continued with their partially overcome team mate to the surface. As soon as they reached the outside, Captain Wilson's absence was noted and a new team entered the mine and brought him out. Arrived at the surface, however, no signs of life could be detected, but artificial respiration and oxygen inhalations were administered and kept up continuously for more than an hour. Adrenalin injections were also given, but the heart and respiration failed to respond to anything that medical science could offer for resuscitation. This man left a wife and two small children.

FATIGUE PROBABLY CONTRIBUTED TO DEATH

Captain Wilson's unfortunate death occurred during the early hours of recovery work before complete organization of forces was possible. It is believed that a contributory cause to this accident was fatigue. The first teams on the scene naturally desired to accomplish the utmost possible toward the rescue of those in the mine, especially as hopes were entertained that many still might be alive. The repeated trips made by this crew undoubtedly caused fatigue which in the stress of their enthusiasm and excitement was little noticed. When a crucial moment arrived when reserve strength was necessary, a fatigued body could not endure the strain. This was evidenced both by the lack of nervous stability on the part of the man whose nose clip was first knocked off and again by Captain Wilson when his strength was not sufficient for him to right his apparatus and make his way 300 ft. to fresh air.

Later on when organization of the work and forces had been accomplished every rescue team before entering the mine was given a careful examination by a physician and upon the least sign of fatigue or other incapacitating condition, the men were forbidden to wear apparatus. After the establishment of this inspection, not a single accident occurred. On several occasions, however, men were excluded from teams for causes which in the opinion of the examining physicians made their use of apparatus not only a possible source of danger to themselves, but also to their team mates.

LIQUID OXYGEN NOT SUITED TO COAL MINES—Studies made by the Bureau of Mines indicate that though liquid-oxygen explosives may be used to advantage, especially in the lessening of blasting costs in iron, salt and other mineral mines and quarries, preliminary tests indicate that they are not suitable for use in gaseous and dusty coal mines. Experiments, however, offer some hope of so modifying these explosives that they may be made suitable for certain uses in such mines.

Deadly Air Blasts from Falling Roof Rock Kill Many Miners in India

BY DAVID PENMAN

MOST of the workable seams in British India are of great thickness. This is particularly true of the mines of Bengal, Bihar and Orissa, where over 90 per cent of the total coal output of India is produced. Seams of 20 and 30 ft. in thickness are common, and in some cases coals 90 ft. thick, and even more, are found. In one instance 150 ft. of coal in one continuous seam has been reported.

Air-blasts, due to the sudden expulsion of air from the collapse of a large area, are not uncommon in Indian mines. One such occurred in 1923 in a mine of the Central Provinces. The area which collapsed was not unusually large, about 5,000 sq.ft. perhaps, and the seam was only 3 ft. thick; but the air in that space was propelled with such force through a narrow surface incline that fourteen persons who happened to be sitting in the incline entrance, preparatory to entering the mine, were hurled through the air for distances varying up to as much as 200 ft. Of these fourteen, twelve were killed outright and one died from the injuries received. In another instance five persons who had retired from a mined-out area on which the roof was weighting to what they thought was a safe position were blown off their feet and dashed against the sides and floor of the gallery. They were all injured, but fortunately none died.

As already has been mentioned, the roof is as a rule strong, and in consequence large areas are often mined out before the main roof gives way. Sometimes the goaf may be standing like a colossal hall, perhaps 400 ft. square, and not a sign of a break be apparent. A collapse of such a size in a 20-ft. seam would displace a volume of air of over 3,000,000 cu.ft. Assuming the actual collapse to occupy an interval of one minute, the velocity of exit of the air through a pair of shafts 18 ft. in diameter would approximate to a mile a minute. Sometimes the actual "fall" occupies much less than a minute.

If the whole area collapsed simultaneously from the surface (which is what probably happened in the mine of the Central Provinces just mentioned above), according to the law of falling bodies the fall in a 20-ft. seam would occupy only slightly more than one second. The collapse of a large area, however, is generally made up of a series of falls, and moreover some of the displaced air finds room in the spaces between the blocks of stone or in upper cavities left by the falls, so that the actual expulsion of air is always less both in volume and in velocity than the theoretical figures based on the assumption that the whole mass fell simultaneously and freely. Nevertheless, the danger is one that must be kept in mind by those who have charge of mines in which large areas of uncollapsed goaf occur.

It has been suggested that the sudden compression of the air at the instant of the discharge of explosives may result in a temperature sufficiently high to ignite an inflammable mixture of firedamp and air. The sudden compression of the mine air due to a large fall of roof must similarly bring about a considerable increase of temperature.

NOTE—From a paper entitled "Some Problems of Indian Coal Mining" read before The Mining Institute of Scotland at its Dunfermline meeting.

Narrowing the Gulf Between Banker and Promoter

What the Banker Will Want to Have in Black and White —
He Doesn't Know the Coal Industry but He Does Know Finance
and He Will Ask Questions You May Not Have Duly Considered

BY P. H. GROSSMAN

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IT IS sometimes said, by promoters, that bankers are the despair of those who would develop the natural resources of this country. It is also as frequently said, by bankers, that promoters are the despair of those who would soundly exploit our great natural resources. It is, in other words, quite evident to the student of the situation that a broad and sometimes impassable gulf separates the two.

The difficulty, like so many of its kind, seems to lie in a more or less superficial misunderstanding rather than in any deep-seated differences of viewpoint. The solution would seem to be a clearer understanding by each of the position of the other and of the means for bringing both banker and promoter together on a common ground.

To say that all bankers classify all natural resource developments as extremely hazardous is as erroneous as to endow all promoters with a belief that all their undertakings are absolutely safe and sound. The banker is primarily a conservator of wealth. The implicit trust imposed in him by the depositors of his bank, forces him to take a negative attitude until the merits of a proposition have been definitely proved to him. He is a banker first and last, and not a promoter. The banker's attitude toward a promoter must be based entirely on the evidence submitted to him: The examination of the property, a prospectus outlining the alleged development possibilities with a statement of expected earnings, prepared, all too briefly, by the promoters; and in most cases a rather glibly optimistic presentation.

Instantly, there arises in the banker's mind that basic element of banking, the seriousness of which only a banker can fully comprehend: "Suppose you fail, what will the investors get for the money I told them to give you?" The banker can be favorable only when every reasonable doubt has been banished from his mind.

For this incredulous attitude, the promoter is most to blame. A resumé of natural-resource financing for the past ten years or more would reveal an unfortunately large number of instances in which bankers, and through them investors, succumbed to the unlightened, if not frankly misrepresented, optimism of the promoters. The promoter never concedes that failure in his particular enterprise is possible. As a class, therefore, he is regarded as radical, as a dreamer, one to whom the unproven is real, one with unbounded enthusiasm, one whose sound business judgment is warped by his ambition, one who enters into a project

body and soul with little or no knowledge of the infinite details involved in the recovery of natural resources. It is this type of promoter who is directly responsible for the failure of many laudable enterprises to bear fruit, and for the abandonment of many properties which with proper financing and administration should have been profitable enterprises.

The question immediately arises as to how we can overcome this divergence of viewpoint. Our industrial and economic future which is dependent upon the development of our great wealth of natural resources, requires the sincerest co-operation between promotion and finance with unison of effort and understanding toward a common end.

Surely we cannot continue forever to attempt to

hurdle the wide gap between proposed enterprise and the source of finance, only to fall midway down the chasm which is becoming deeper and more difficult of spanning, because of the visionary attitude of the promoter on the one side and the unconsciously retrogressive attitude of the banker on the other.

What is the remedy of this situation, for remedy there must be? There can be only one answer: First, the use and dependence upon facts rather than dreams on the part of both banker and promoter; and second, the discovery and presentation of all relevant facts in each instance. This means, simply, that before he approaches a banker, the promoter should arm himself with all provable and reasonable facts regarding the raw material in the ground, the process of its extraction, the manufacture or fabrication, its distribution, and finally its potential usage. Only with such compendiums of facts, but with assurance if they are presented, can promotion and finance arrive at a mutual understanding.

The marshalling of this evidence is not a task for either the banker or the promoter. In the first place, both are interested parties, and both must consequently though unconsciously see things through the eyes of preference or prejudice. Neither has the facilities, the training, the experience, or the time to make a sufficiently adequate investigation. Both, however, can avail themselves of the services of organizations with a personnel of specialized training, each individual of which has the intellect and power to rid himself of any preconceived conclusions and to start out with a desire for the truth with facts as his only objective.

The facts are there. It is the natural-resource appraiser's duty to find them. He can add nothing to

nature. He can only bring a trained mind to bear upon the gleaning of these facts. His investigations are unimpassioned but relentless. His findings are disinterested and authoritative.

The appraiser of natural resources must be more than an engineer. He must have the acute perception of the engineer, but he must combine with this the viewpoint of the investor, of the banker, and of the promoter. He must see details as they affect the whole. He must have the ability, the courage, and the conviction to conduct his investigations in an unbiased manner, with consideration of all hazards as well as of all advantages incident to the particular case. He must be competent to withstand the ambitious optimism of the promoter as well as the conservative pessimism of the banker. He must, in other words, arrive at his conclusions and present them in such manner as to be of the greatest possible assistance in the exploitation of our natural resources.

Much might be said about the qualifications of the natural-resource appraiser, and much should be understood by the banker and the promoter who are to successfully employ his services. The appraiser must be competent to test his own conclusions in the practical affairs of life, and if he has not the time or opportunity to do this, he must be eager to have other competent persons do it for him. He must be a guide in, and inspiration to, industrial progress. And above all he must be the rectifier of errors. There are few individuals or organizations so constructed as to be better or more exclusively devoted to the public good.

PROMOTERS FAIL TO SEE GLARING HAZARDS

The need for his services is peculiarly manifest in the promotion of undeveloped or only partially developed properties which have no history of operation. All too frequently in these instances, glaring hazards are overlooked or powerful advantages missed because of a too cursory view of the process. The following case is typical: Certain promoters desired to finance the acquisition of a certain marble deposit. The property consisted of several hundred acres of land underlaid with the deposit and equipment worth about \$100,000.

The product of the deposit was of unusual quality, and in a quantity that could not be exhausted in less than 300 to 400 years. These two elements were so plainly evident that the promoters, in their overabundance of enthusiasm, failed to give proper consideration to the great number of other facts which in this instance were of even greater importance, nor did they believe that anything else mattered once the facts as to quality and quantity had been definitely established. They failed to ask themselves and then answer the question "What will we do with it after we have it?"

They had a definite financial program in mind, which, however, was not acceptable to the financial interests approached, and was entirely changed after an investigation and analysis by an appraisal organization of the following points to which the promoters did not attach sufficient importance:

LOCATION:	Size, area underlaid, remoteness from metropolitan influence and nearness to other operations of a similar character.
EXPLORATION:	Method used, when, by whom, to what depth, and at what points on the property.
QUALITY:	Chemical and mechanical analysis and uses to which the product could be adapted.
RECOVERY:	Relation of quantity of commercially recoverable quantity to the total quantity in place.
DEVELOPMENT:	Cost of equipment, and all operations necessary to open the deposit to a point of commercially profitable recovery, representing capital invested.
COST OF RECOVERY:	Administration, labor, power, supplies, compensation and other insurance, taxes, depreciation and maintenance on equipment necessary for and devoted to recovery, working capital, interest on investment, and contingencies.
WASTE:	Relation of quantity quarried or mined to quantity commercially salable.
SHIPPING FACILITIES:	Nearness to and extent of railroad and water connections.
MARKET:	Where, to whom, in what quantity, for what purpose, at what freight rates, at what selling prices, from what source is this market now supplied? What quantity and quality of product is being supplied by competing operations?

Through analysis of these elements and the facts affecting them the reasonable expected gross return from which the cost of recovery is subtracted results in the net earnings available.

The net earnings in this instance were far from sufficient to justify the capitalization as proposed by the promoters, and thoroughly illustrated the folly of their financial program. Through the analysis that was made, however, elements of extreme importance were revealed to the promoters, thereby permitting intelligent construction of their organization and providing for certain advantages of which they knew nothing.

Only an organization thoroughly equipped beyond its engineering talent with ample reference resource, authentic statistical data, and an appraisal personnel of practical judgment, gained through years of experience, can in these unproven cases fairly and open-mindedly consider the hazards as well as the advantages in a manner which is of inestimable value to the proposed operators, of real assistance to the bankers, and of protection to the investor. Such an organization creates a situation built upon facts and affords an opportunity for sane discussion on a mutually understood basis.

APPRAISAL ORGANIZATION AIDS ALL PROPERTY

Even in the case of developed properties having a history of operation there is need for such services. These properties are too frequently found warped by weight of their own internal affairs; their management is often totally oblivious to progress in their own field of endeavor. An appraisal organization composed of specialists offers the best antidote for such and other business diseases. The appraisal investigation and analysis often provides for a new program of progress, many times bringing tottering businesses to their senses and frequently proving to the outside world that a particular enterprise has real merit and can proceed successfully with the aid of finance which it can get only through the uncovering of facts properly analyzed and presented in an understandable manner to the wants of those who "must be shown" in order to become convinced that the particular business is deserving of the financial assistance desired.

SOMETIMES the management of a mine becomes frozen so that it no longer ebbs and flows with circumstance and a third party with his judgment free to judge a proposition on the basis of present and probable future conditions is able to give valuable direction that will add value to a property when a sale is being made or the plant is to be used as a security for an advance of capital.

In cases where new projects are proposed as in the case of undeveloped properties, or, in cases where additional capital is required, the appraiser renders the most important service. He must be competent to determine the soundness of the new investments, the dependability of income to the investor, and to what degree the principal invested will be safeguarded, the adequacy of the security, and the degree of certainty of the borrower to pay the stated interest.

In one case, for instance, an operator needed added capital to the extent of a half a million dollars, but had difficulty in obtaining it. He knew his own business thoroughly, but he alone knew it. In approaching financial interests he was unable to present his problem in a manner free from conscious or unconscious bias. The statement of earnings as presented by him showed a rather substantial net income, but after the same process of investigation and analysis as was described above, it was revealed that the earning statement compiled by him was wrong.

He had charged to operating expense items properly belonging to capital account, and it was further revealed that a byproduct which had been given little attention in the past, could be diverted to a market which would bring a rather substantial return. As a result an earn-

ing statement was compiled which when presented with a detailed appraisal of the plant and its equipment showed the desired loan of half a million dollars more than justified and it was quickly obtained.

The value of any natural resource is dependent upon its earning ability and it is, therefore, fundamental that proper recognition be given to all relevant facts affecting the recovery, processing, marketing and utilization of the product and their collective influence upon the expected earning capacity of the enterprise.

Only after all investigation and necessary analytical work to determine the extent and truth of the advantages and hazards affecting these elements has been properly completed, can the facts be revealed and assembled into a workable plan of operation. A statement of anticipated earnings can then be compiled to show an expected net income which when capitalized in accordance with standard practices will result in the present fair value of the deposit.

Properties of real merit have failed to get started and may have failed in their infancy because of an improper beginning. In each instance it would probably be found that the underlying cause of these failures was the lack of a competent appraisal analysis compiled in a businesslike manner.

The Miner's Torch

Who Envies the Engineer?

IN THE course of a business transaction in which I have just been concerned I fell heir to a report covering the trusteeship of a coal-mining property dated only a few years back, and because it happened that at the moment when I first saw the report I had a few idle moments on my hands I read the report through carefully, which is something that I or no other person could have done ordinarily.

We hear much about the fees earned by professional men in the so-called learned professions in contrast to the fees earned by engineers. The report that I have just mentioned contained some sure enough first hand reliable information along that line and I am loaded now for the next college professor who tries to tell me that all this talk about engineers being poorly paid is untrue and harmful to the profession.

Boiled down the events contained in the "account" ran something like this:

(Act 1). Company thrown into bankruptcy with no money in sight to pay any of its creditors and all of its stock (\$200,000 original value) declared worthless. \$200,000 in bonds probably fully secured as the land and improvements were always considered worth in excess of \$300,000.

(Act 2.) Trustee in Bankruptcy appointed followed six months later by a Bondholders Protective Committee. All operations had been discontinued before the Trustee was appointed.

(Act 3). The lawyers appointed by the Protective Committee recommend a consulting engineer and he is employed to appraise the property and suggest, if possible, a purchaser to be interested in the property at the engineer's valuation.

(Act 4). Valuation report is submitted and purchaser located by the engineer who agrees to pay \$220,000 in cash and assume all outstanding bonds.

(Act 5). Committee makes final accounting and accounts for the \$220,000 in cash about as follows:

Compensation for fees and expense of counsel for Committee	\$50,000
Compensation of Committee	25,000
Compensation paid to Secretary of Committee	5,000
General expense including reports on property and all engineering services	11,000
Trustee in Bankruptcy	100,000
Taxes and Insurance	12,000
	<hr/>
	\$203,000
Amount for distribution to depositors of bonds	20,000

I was tempted to underscore certain items but it occurred to me on second thought that they might be construed as "contempt of court."

WASHES DIRT OFF COAL WITH WATER.—At the strip pit of the Harrisburg Coal Mining Co., Harrisburg, Ill., the overburden, 45 ft. thick, is removed by a large steam shovel and then the surface of the coal is scraped free of impurities. That done, the top of the coal is generously flushed with water from large reservoirs nearby. In this way the coal is rendered clean of overburden, but before it is cleaned of those impurities which go with the bed it passes over the screen and in so doing is thoroughly sprayed to move any overburden or bottom clay that by chance may have mixed with the coal.

BROWN COALS may be developed in various parts of the empire as a useful fuel, according to W. A. Bone, Professor of Chemical Technology at the Imperial College of Science, who, in an address to the British Association for the Advancement of Science in session in Toronto, pointed out that these coals are found in extensive deposits in the various colonies and dominions. He suggested that research by chemists and engineers will make it possible to utilize many of these reserves which are at present receiving little attention.

How a Copper-to-Steel Bond Is Made, with Tests Proving Its Efficiency and Endurance

Direct Union of the Copper Terminal to Rail Provides High Electrical Conductivity—Mold Confines Heat to Terminal While Bond Is Being Formed—Copper Sleeve Protects Strands of Cable Against Breakage

BY J. B. AUSTIN

Research Engineer, The Rail Welding and Bonding Co.,
Cleveland, Ohio

MUCH PROGRESS has been made in the welding of copper to steel, in the design of bonds and molds and in the method of applying the all-copper bond. This process of welding copper to steel is well adapted to the bonding of mine tracks.

Each step in the development has been the outcome of careful tests in which the relation of any part of the process to the general problem has always been considered. In consequence of the many investigations, a simple, quick and reliable process has been evolved, providing a permanent electrical connection between rails that is cheaply and easily installed. As the sole object of the bond is to bridge the gap between the rails it seems only logical that this path should be copper. Such a bond is made by directly welding the all-copper bond terminals to the rail with copper.

In welding the terminal of an all-copper bond to the rail, it was soon learned that a mold was necessary in order to hold the weld metal in proper position in relation to the bond head. Copper melted under the electric arc is quite fluid, and without the mold it is impossible to retain the metal in contact with the rail. With such a mold, the bond is held in its correct position, relative to the rail, and the weld is confined to its proper limits. The casting is also compact and uniform in size. The metal can be positioned properly by the mold, the welder can focus his entire attention on the actual welding operation much improving the quality of his work.

The process of arc-welding copper to steel requires that the molten copper shall not only be held in contact with the rail but shall also be hot enough to bring the surface of the rail to such a temperature as will eliminate rust and scale and effect the weld. In building up a weld, it was found that the lower layers of copper were likely to chill against the rail. A refractory mold eliminated this chilling to a large extent by retaining the heat within the mold. Many materials were tested, and carbon was selected as the most suitable mold material because of its comparatively high electrical conductivity and its low heat conductivity. It was the only material tested which satisfactorily withstood the intense heat of the arc without mechanical failure or rapid deterioration.

OLD PROCESS OF WELDING COPPER TO STEEL

The original process of welding consisted of melting scrap copper into a carbon mold by means of a carbon arc. In order to obtain a satisfactory weld with pure copper, it was necessary to direct the arc directly into the rail and to wash the scale oxide free so that the surfaces of the metals where in contact were clean. A weld was then made, but when the copper of such a weld was sheared from the steel, much porosity was noticed along the welding surface.

Further examination with the microscope showed that a weld of this type was of a questionable character. Between the copper and steel there was a rather wide brittle alloy zone in which were many fine hair-line cracks. This zone was in some cases $\frac{1}{2}$ in. to $\frac{1}{4}$ in. wide. The conclusion drawn from these tests was that any nicking or gouging of the rail was distinctly detrimental to the rail, as well as to the bond-head casting.

COPPER-SILICON ALLOY MAKES BEST WELDING ROD

Extensive investigations were then made to obtain a flux or alloy which would eliminate the gases from the molten copper and reduce the oxide scale without what had been the inevitable gouging of the rail. Many different elements were tested as alloys, and probably 600 or more welds were made before a suitable element in the proper proportion was obtained.

As a result of this investigation, an alloy copper rod was developed which thoroughly eliminated the gases from the copper and from the surfaces between the copper and the steel. This rod contains a powerful deoxidizer which has the special advantages of reducing the oxide scale at a relatively low temperature, and of giving a resulting casting of relatively high electrical conductivity. This fluxing action permits clean degasified surfaces of copper and steel to come into intimate contact so that a weld can be made over the entire contact area.

In order to weld this copper-silicon alloy to steel it is only necessary to melt the alloy adjacent to the steel and play the arc upon it for a brief time. The rail is not gouged at any time, for the arc is played directly upon the copper. In shearing the weld metal from the steel, there is not the abrupt failure which character-

ized the rather brittle weld of pure copper to steel. Instead, the copper weld metal, which was dense, non-porous, fine-grained and ductile, sheared slowly. Microscopic examination of this union showed a distinct line of contact between the copper and steel. The alloy zone which joined the copper and steel when observed under high-power magnification showed that it varied but little



Fig. 1—Microscopic Structure

Photomicrograph of a copper-to-steel weld made with the new copper-silicon electrode. Note the absence of porosity and the uniformity of the union between copper and steel.

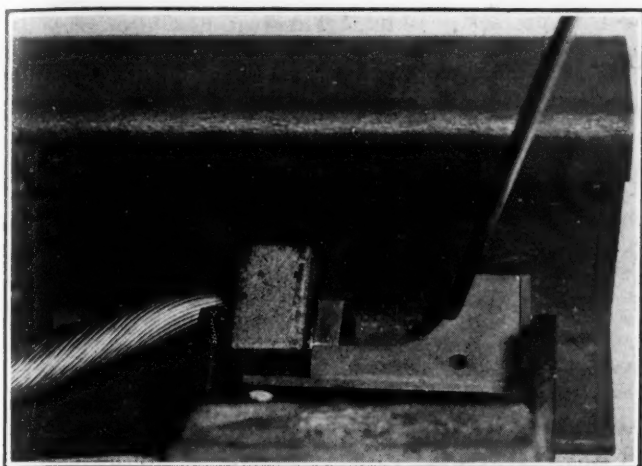


Fig. 2—Mold in Position for Making Weld

A 4/0 base bond and mold are shown ready for welding. The mold holds the copper cable in place and retains the deposited metal. The arc is first drawn from the carbon mold.

in width. The hair-line cracks observed in previous welds made by the gouging process were entirely absent. Fig. 1 is a photomicrograph of a copper to steel weld made by this new process.

Two processes have been developed for applying all-copper rail bonds. The results obtained with either process are identical. They are known as the carbon-arc and the copper-electrode process. The former involves the use of a dynamotor which reduces the open-circuit voltage to about 60 volts, suitable for carbon-arc welding and sets up a local welding circuit with the rail of positive polarity and the carbon electrode of negative.

The alloy rod is then melted by means of the carbon arc. In the latter process either a dynamotor or a resistance welder is used, and the arc is drawn between the copper electrode and the mold. In the carbon-arc process, the electrode and the filler rod are separate, whereas in the copper-electrode process, they are one and the same. As the latter process is that used in the mines the rest of this article will be confined to a detailed description of the process as it has been developed for the application of mine bonds.

ALLOY CLEANS RAIL OF SCALE AND RUST

The process of applying a base bond may be described as follows: Excessive scale and rust are removed with a file or wire brush where the weld is to be made. It is not necessary to grind the rail as the alloy rod cleans the rail during the welding process. A current of 200 amp. is best for welding a 4/0 base bond.

Fig. 2 shows the position of the bond and mold ready for welding. The mold fits snugly against the web of the rail. This photograph also illustrates the use of the mold as a positioner for the bond.

The first step in the process is shown by Fig. 3. The arc is drawn from the carbon mold and with an arc length of about $\frac{1}{4}$ in. the metal is deposited as indicated by the arrow starting at the extreme right. During this step, the first layer of metal is deposited and the weld to the rail is obtained.

The second step in the process is shown by Fig. 4, the pool of the first layer of copper is now attached to the cable. This is accomplished by directing the arc at the head of the bond on its lower side, near the rail flange.

The third and final step of the process consists of advancing the arc over the entire area and melting down the bond head and washing the copper against

the web as the molten pool of copper rises in the mold. The arc length may be $\frac{1}{4}$ in. to $\frac{3}{4}$ in. and still the results will be satisfactory. Fig. 5 shows the completed weld. In welding a 4/0 bond head by this process about 40 sec. is required to complete the entire series of operations.

RESISTANCE LOWERED WHEN ALLOY WAS USED

Resistance measurements were made of a number of bonds welded with pure copper and the silicon-copper alloy rod by the bridge method. Tests of the same bonds were made by the volt-ammeter method. The voltage drop was measured across the bond head on the center of the rail head with a current of about 275 amp. through the bond. Though this test is not as accurate as the bridge method the error is about the same for each type of rod and the results shown in Table I therefore are comparable.

Table I—Resistance of Pure-Copper and Silicon-Copper Bonds

Type of Rod	Number of Bonds Tested	Average Equipment Feet of 6-In. 100-lb. Rail	Volt-Ammeter Resistance of Bond in Ohms
Pure Copper.....	4	3.146	0.0000305
Silicon-Copper.....	4	3.042	0.0000294

The test shows that because of the elimination of porosity the use of the silicon-copper alloy slightly lowers the resistance. A small percentage of silicon remains in the finished bond head. The larger percentage of silicon in the original rod is used up in the reduction of the oxide. It is also interesting to note that of many of the alloys that might be used for welding copper to steel, the silicon-copper alloy lowers the electrical conductivity the least.

Comparative shear tests were made of pure-copper-to-steel welds and silicon-copper-to-steel welds. The bonds were welded to the head of a 6-in. 100-lb. T-rail. The bond heads were sheared in an Olsen universal testing machine of 200,000 lb. capacity. The results were as in Table II.

Table II—Shearing Strength of Silicon-Copper and Pure-Copper Bonds

Type of Rod	Number of Tests	Average Shearing Strength, Lbs. per Sq. In.
Silicon-Copper.....	8	27,062
Pure Copper.....	6	17,380

The use of the silicon-copper welding rod increased the shearing strength of the bond head about 55 per cent. This increase in shearing strength of the weld is

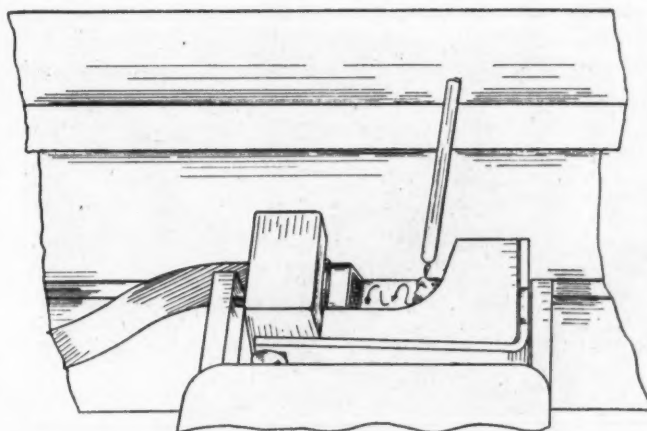


Fig. 3—Laying in the First Layer of Metal

The special electrode is used as shown and the metal deposited and welded to the rail. The arc used is about $\frac{1}{4}$ in. long.

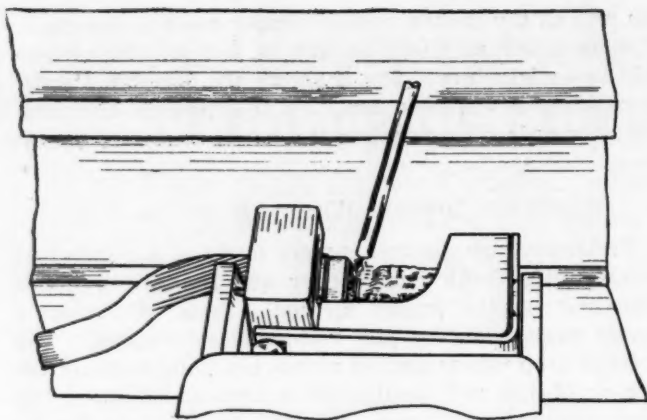


Fig. 4—Welding Copper Wire to Deposited Metal

In this step the first layer of copper is attached to the cable. This is done by directing the arc at the head of the bond near the rail flange.

attributed to the elimination of porosity and to the general improvement in the union between the copper and steel.

The improvements in bond design have been accomplished largely through results of tests made by a specially constructed fatigue-testing machine. If bonds were placed in service in order to obtain an estimate of their fatigue life, much time would be required and the nature of the test would vary from one joint to the next.

In order to arrive at a proper bond design, it was deemed advisable to standardize a test and to construct a machine which would test the bond under the most severe conditions. The proper cable length, arrangement of strands, proper protection of the strands where they unite with the weld metal, etc., are all factors which are of vital importance in bond design.

The test was made as follows: The bond terminals were welded to steel plates which were attached to vertical arms actuated by cams on a rotating shaft. The position of the bond was similar to the position which it occupies relative to the rail in service. The maximum vertical relative displacement of the two heads was $\frac{1}{8}$ in. which corresponds to an extremely severe service condition,—one, in fact, which seldom, if ever, exists.

The original all-copper bond has been greatly improved by the addition of a copper sleeve or skirt which gives a fillet effect to the bond where the strands unite with the weld metal. The fatigue stresses are distributed rather than concentrated at the strand-to-bond head union. Copper was found to be the best material

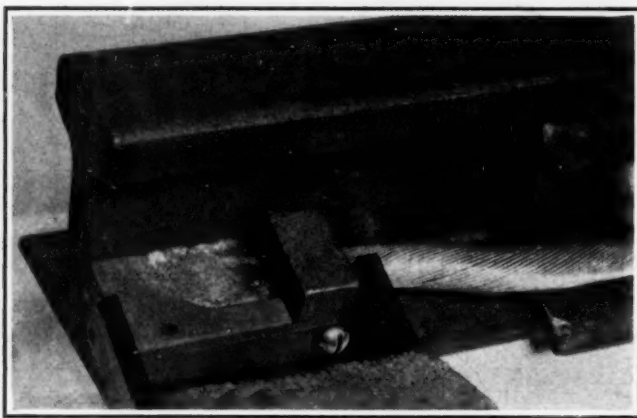


Fig. 5—A Completed Weld of Copper

By advancing the arc over the entire area and melting down the bond head the molten copper is washed up against the web of the rail and the weld completed in about 35 sec.

for this protective skirt. The test has also made it possible to determine the best cable length and arrangement of strands. The improvements brought about by the addition of the copper skirt and by increasing the length of the original 6-in. 4/0 bond one inch is shown by Table III.

Table III—Fatigue Test of Bonds With and Without Protective Skirt

Type of Bond	Number Tested	First Strand Failure Vibrations	50 Per Cent Failure Vibrations
6-in. 4/0 Bond without Protective Skirt.....	2	220,500	420,000
7-in. 4/0 Bond with Protective Skirt.....	2	660,000	3,000,000

In passing over the rail gap, the car wheels strike the rail they approach with considerable impact. The magnitude of this impact is dependent upon the width

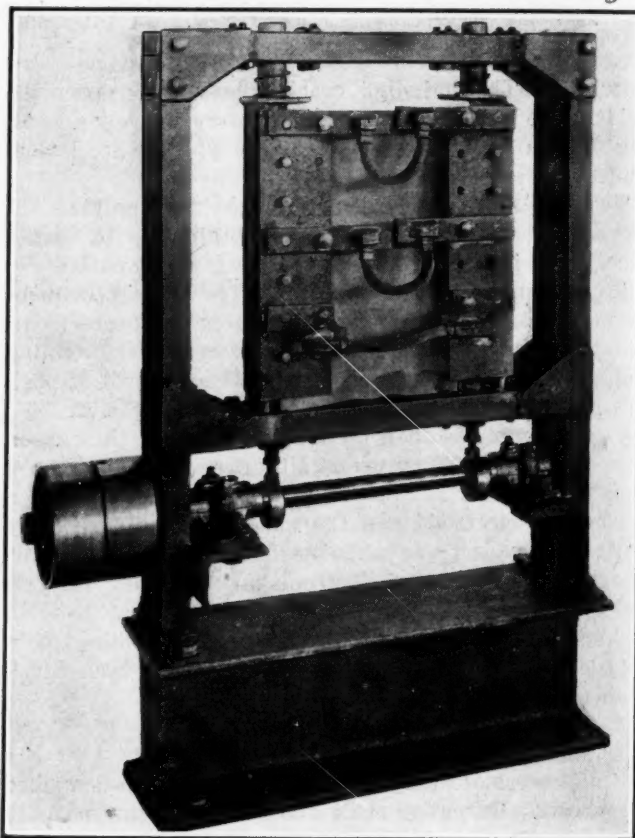


Fig. 6—Bonds Tested Under Severe Conditions

This machine consists of two cams which stress the bond and cable under conditions more adverse than in actual operation.

of the gap, the alignment of the rails, the surface alignment of the track and the general condition of the joint structure and roadbed. Cupped rails increase this pounding considerably. As the rail flange is in tension, failure would be likely to start in that member if it is weakened at all by the application of a bond.

In order to determine whether or not the welding of base bonds by the copper electrode process damaged the rail, the following test was devised: A weld was made at the center of a 25-lb. mine rail on the base near the web. The position of each weld and the size of the rail was the same in each case. The rail was then placed head up on a span support of 24 in. The supports consisted of rails placed on heavy oak blocks. The rail was subjected to the blow of a 250-lb. hammer falling 28 in. The hammer struck the center of the rail head directly above the weld.

The results of these tests are shown in Table IV

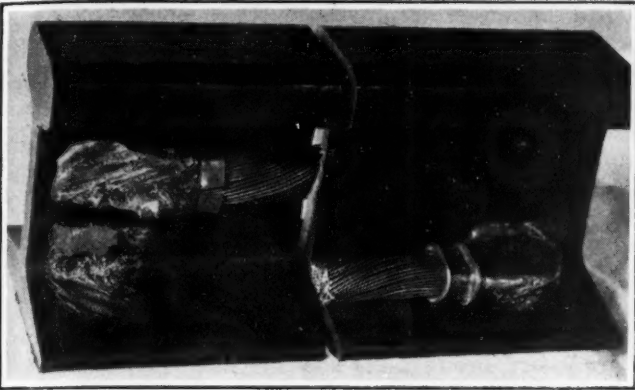


Fig. 7—How the Copper and Steel Are Joined
A homogeneous mass of copper forms intimate contact with the steel of the rail and produces a contact having low electrical resistance.

The results in Table IV show conclusively that the process used in welding all-copper rail bonds does not injure the rail. This is attributed to the fact that in welding silicon-copper to steel, the arc is not directed at the rail, but plays upon the molten copper. By this process, the heat is distributed rather than concentrated. Naturally, the residual internal stresses are much lower, and there is no notching effect under impact. The results obtained with the carbon-arc process and copper-electrode process are practically identical. The fact that a new 25-lb. bonded rail withstood five hundred 28-in. blows of the 250-lb. hammer and did

not fail after a deflection of $\frac{31}{32}$ in. is convincing evidence of the quality of the copper-electrode weld.
The rail joint is subjected to flexural as well as to impact stresses when the wheel load passes over the rail between ties. This stress becomes a maximum when the application is at a point midway between ties. In order to determine the resistance to flexural stresses of a mine rail with a copper-to-steel base weld, a special test was made. A 4/0 bond head was welded at the

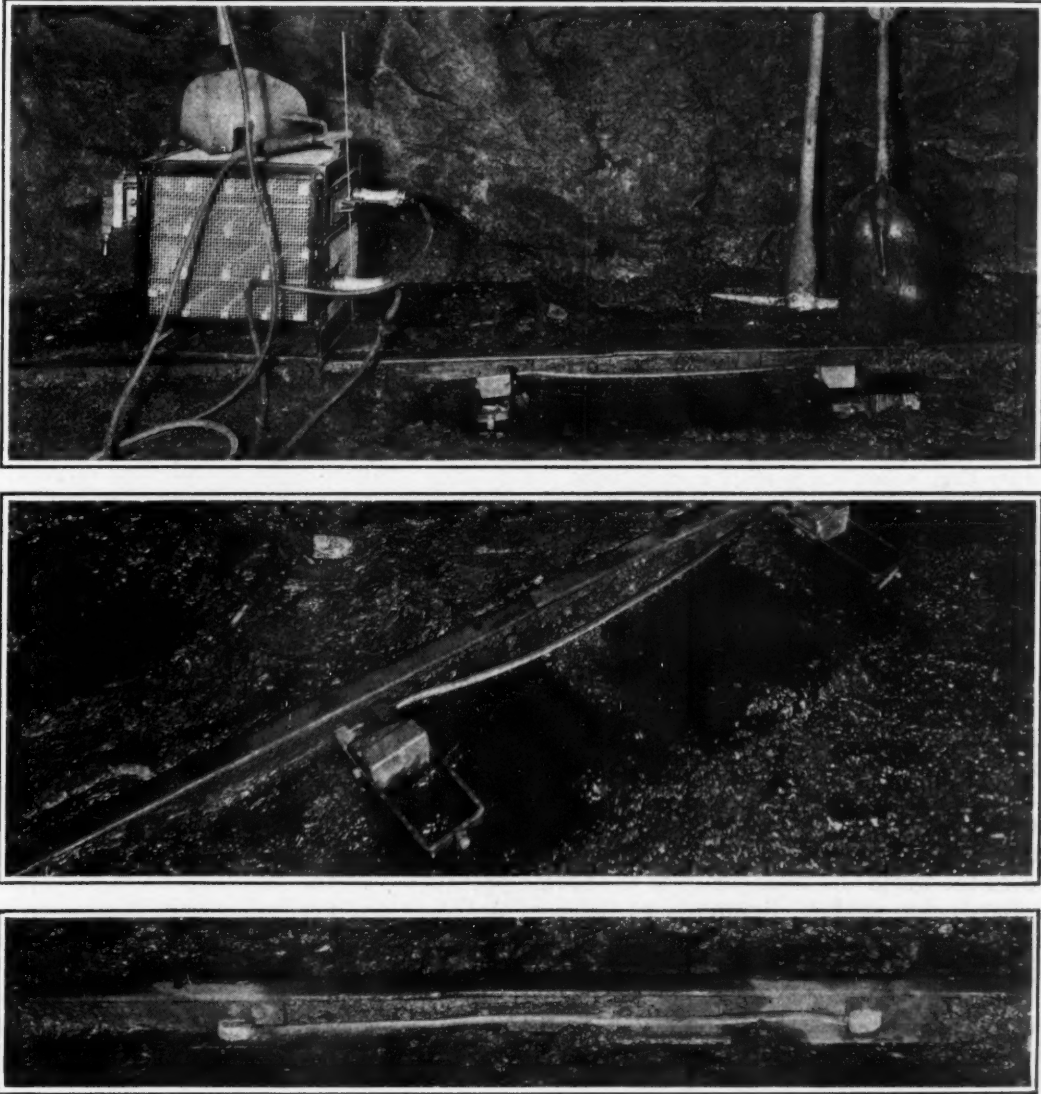
Table IV—Impact Test of Bonds				
Type of Bond	Number Tested	Average Number of Blows	Average Final Deflection	Type of Rail
4/0 base Bond Copper-electrode Weld on Rail Base. New Process.....	3	500	21/32 in.	New 25-lb. rail
4/0 base Bond Copper-electrode Weld on Rail Base. New Process.....	3	100	5/16 in.	25-lb. rerolled
4/0 base Bond Carbon-arc Weld on Rail Base. New Process.....	3	100	$\frac{1}{4}$ in.	25-lb. rerolled rail
Rail with No Bond.....	3	100	7/32 in.	25-lb. rerolled rail

Note:—Failure did not occur in any case.

center of the rail on the base near the web. The rail was then placed head up on two steel supports with a span of 24 in. The load was applied at the center of the rail head directly above the bond head. Each specimen was given a maximum deflection of 2.6 in. Half of the specimens were welded with the carbon arc and half with the copper electrode. The results are indicated in Table V.

Fig. 8
Welding Stages

Excessive scale and rust are first removed in the usual manner by means of a file or wire brush. The alloy rod does most of the cleaning during the welding process. These illustrations show the equipment necessary for placing a 4/0 bond on the rail. When applying the bond the arc is directed upon the molten copper and the heat is thereby distributed rather than concentrated in a manner that would cause injury to the rail. The mold confines the heat and thereby aids in facilitating the application of the bond.



The severity of this test may be realized from the fact that measurements showed the width of the rail base and the rail height to have been reduced about $\frac{1}{8}$ in. at the point where the bend occurred.

It is interesting to note that the percentage of failures of the unbonded and bonded specimens of rail

Table V—Test of Bonds Under Flexural Stress

Type of Bond	Number of Tests	Number of Failures	Percentage of Rail Failures
4/0 base bond, copper-to-steel type, welded to rail base by new process.....	36	4	11.1
Rail with no bond.....	12	1	8.3

were of the same order of magnitude. It is, therefore, fair to assume that the failures of the bonded specimens might have occurred if the rail had not been bonded. Considering the magnitude of the deflection, which is out of proportion to what actually occurs in service, the conclusion may be readily drawn that rails with all-copper bonds welded to the base, are practically unaffected by the welding.

Darco, a Boneblack, Is a New Product of Lignite

Large Plant, Owned by Powder Company and Located in Texas Lignite Field, Will Make Sugar-Refining Charcoal

BY HOWARD C. MARSHALL
Austin, Tex.

WITH the recent reopening of the \$1,000,000 plant of the Darco Corporation of Wilmington, Del., a subsidiary of the Atlas Powder Co., with a plant and mines at Marshall, Tex., lignite coal will be put to an entirely new use. The Darco plant is the largest establishment in the world for the making of decolorizing and deodorizing carbons from lignite coal.

Darco is a product new to the commercial world. Briefly, it is a decolorizing and deodorizing carbon which its manufacturers claim will take the place of boneblack in the refining of sugar. Its manufacturers claim that it will eventually replace that substance because it can be produced at the Marshall plant much cheaper than other sugar-clarifying agents.

Boneblack is a charcoal made by burning crushed bones. It purifies sugar liquids in the same way that a gravel filter will purify water, only much more thoroughly. The main steps in the manufacture of Darco are: First, the crushing of the lignite; second, the retorting of this crushed product to drive off the volatile gases; third, the treatment with hydrochloric acid to eliminate the ash. When ready for use, Darco and boneblack are much alike in texture and general appearance.

One of the big commercial advantages which the Darco manufacturers will have over their boneblack competitors is the fact that whereas bones are collected from all over the world and transported to the burning plants, the Darco raw product, lignite, is at the very door of the factory.

At the present time, the Darco Corporation owns 300 acres of lignite land ten miles south of Marshall, and holds option on several hundred additional acres. It has been estimated that there are approximately

10,000,000 tons of lignite in the company's holdings, practically all of which is of the proper quality, and is easily accessible for mining and manufacturing of the Darco. The estimated capacity of the big plant at Marshall is 150 tons of raw lignite daily, from which 25 tons of finished product can be made.

At present, the plant of the Darco Corporation consists in more than ten buildings, which cover a total area of 66,000 sq.ft. It is situated just outside the city limits of Marshall on a site of 85 acres, and on the main line of the Texas and Pacific R.R. The plant is served by approximately 3,200 ft. of track, over which the raw materials are brought in, and the finished product is shipped out.

Automatic conveying and handling devices are employed in the buildings, all of which are of fireproof construction. From the moment the raw materials is dumped from the cars until it emerges in neatly sealed and standardized packages of Darco it is handled entirely by machinery.

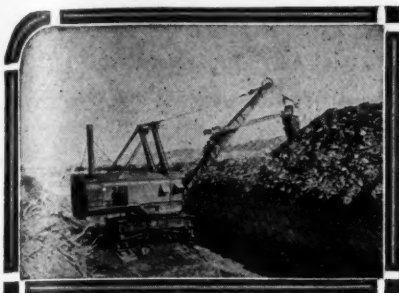
Babcock and Wilcox boilers and a 600-kw., turbo-generator equip the power house, which is itself of brick-and-steel construction. Superheated steam is generated in these boilers at 200 lb. pressure, passed through the turbo-generator, and then is carried at low pressure to the main plant where it is used in process work, thus generating electrical energy at low cost.

R. E. Demmie, a Belgian chemist, for a number of years conducted experiments with lignite coal, at Homer, La., looking toward the discovery of a new decolorizing and deodorizing agent to be used in the refining of sugar. He succeeded in interesting the Atlas Powder Co. of Wilmington, Del., in his experiments. A small experimental plant was constructed at Homer, and here it was proven that Mr. Demmie's discovery, Darco, could be made a commercial success.

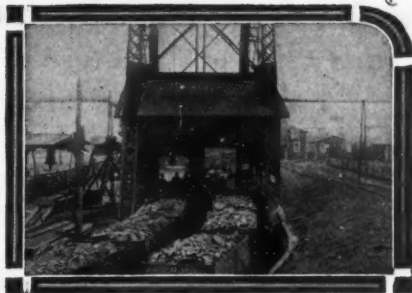
Three things were essential to the place where the big plant should be built: Adequate transportation facilities, cheap fuel, and nearness to the raw product, lignite of a particular variety. Marshall had the transportation requirements, and it could get the fuel, natural gas. But at the time, it did not know that it had the lignite. More than two hundred test wells were sunk, and it was found that surrounding Marshall, particularly about ten miles to the southeast of the city, was one of the largest and richest lignite fields in the world. The actual discovery of the big field was made by Mrs. W. C. Martin, of Dallas, Tex., who was engaged in sinking a number of water wells on her ranch property in the Sabine River bottoms.

A 10-in. gas main was promptly laid from the Bethany-Elysian fields. This line can carry 20,000,000 cu.ft. of gas every twenty-four hours. It is estimated that the gas fields can produce a capacity of 100,000,000 cu.ft. of gas daily. The industrial gas rate is as low as 7c. per M. ft., this giving Marshall, it is believed, the lowest industrial gas rate in the Southwest. Domestic consumers of gas are supplied by the Texas Co. from another field.

The final consideration in the selection of Marshall was the fact that the city is approximately one hundred and fifty miles from Beaumont, two hundred miles from Houston and Galveston, and three hundred miles from New Orleans. The main difficulty which the Darco people have experienced so far, and will continue to experience, is getting the refineries divorced from the age old boneblack process.



News Of the Industry



Old Parties Would Boost Union Output To Nullify La Follette's Power

**Fear Unemployed Miners May Vote for Third-Party Candidate—Increase in Work Likely to Influence Workers in Other Industries—
Need of Statistics Emphasized**

BY PAUL WOOTON
Washington Correspondent of *Coal Age*

A major effort is being made by each of the old parties to stimulate employment of coal miners in the union field. Unless some means can be devised to increase production in the Central Competitive region it is feared that many of the coal miners out of employment will vote for Senator La Follette for President. It is true that the returns to the U. S. Employment Service from Ohio, Indiana and Illinois show no significant amount of unemployment, but it is admitted there is large concealed unemployment in those states. This term is used at the Labor Department to indicate employment at a wage substantially less than the worker is capable of earning at his own vocation. The discontent engendered by employment under such conditions is almost as great as that which accompanies unemployment.

Since each of the parties is convinced that a majority of mine workers vote with it under normal conditions, there is a general desire among leaders to devise some means of increasing coal production in the doubtful states. While Illinois is not regarded as doubtful, there is the greatest uncertainty as to the political situation in Indiana and Illinois. There also is the consideration that the employment of a greater proportion of the coal miners will influence labor engaged in other pursuits. While each of the parties is equally anxious to do something to increase coal-mine employment, the Republicans happen to be in a position to accomplish more in that direction through their possession of the machinery of the federal government.

Abandon Plan to Cut Wages

Two ways of increasing employment have been given consideration. One is the reduction of the union scale in the hope that this would reduce costs to the point where many mines could compete with the non-union product. The other is to induce consumers to increase their purchases. Since the politicians in charge of the campaign work are not thoroughly acquainted with the coal business, their first thought was that a reduction in the

wage scale would be all that is necessary. Since then they have been told that this would not necessarily increase employment to any great extent, as any cut in the union wage would result in a corresponding reduction at non-union mines. While it now is recognized that a reduction in the scale might not be productive of a great increase in employment there still is considerable sentiment in favor of such action. Some are of the opinion that the union leaders in their hearts would like to see this done, as it would make easier their task of extending their organization. It is known that a determined attempt is being made to win back some of the ground lost in Kanawha, New River and other fields. Wage levels in the non-union field already have reached the point where some complaint is being heard. If they were forced to new low levels by a reduction in the union scale, it would increase union sentiment.

G. O. P. Would Speed Output

So far as the Republicans are concerned chief reliance seems to have been placed on an effort to speed up consumption. Some are unkind enough to say that the recent official pronouncements urging early coal purchases had a political motive. Whether or not that be the case it is declared that the word is being passed around to large industries that there is no better way to increase the Republican party's chance of success than to store coal at this time. It is being pointed out that here is a perfectly legitimate way to help the party and at the same time, in view of the probability of a severe winter, to take a prudent business step. Since this objective meets the thorough approval of the Democratic leaders, it is anticipated that they as well will encourage early buying of coal.

Incidentally, this movement does not have to exaggerate the situation to prove the advisability of coal purchases at this time. While it is unfortunate that the stock report cannot be made available before the first week in October, the figures covering production during the first eight months of the year now are available. Performance during the past two months has been

disappointing and has pulled down the year's average.

A month ago it seemed probable that 1924 production would aggregate 455,000,000 tons. It now has been necessary to revise that estimate downward. Even allowing for the average seasonal increase, it is difficult to figure how the 1924 production can exceed 442,000,000 tons. The lowest conservative estimate which has been made of 1924 consumption is 480,000,000 tons. Even if that low estimate is correct the probabilities are that stocks will not exceed 20,000,000 tons. Were the country's reserve to be reduced to that point, conditions would be ripe for a runaway market on any slight scare.

If 1924 production should not exceed 442,000,000 tons the extent of the depression in the industry can be realized in view of the fact that it is necessary to go back to 1911 to find a normal year with production at a lower rate. Production was lower, of course, in 1921-1922 because of post-war deflation and in 1914-15 because of the paralysis following the outbreak of the European struggle.

Coal Statistics Needed

This entire situation emphasizes again the need for more coal statistics. It can be stated on high authority that more is known of nearly any other important commodity than is known of coal. It is true that the forthcoming stock report will meet the most crying need of the immediate situation, but before the coal business can be conducted entirely in the light much more should be known of distribution and consumption, to say nothing of statistics covering various other important phases of coal production and distribution.

The hope is entertained that the difficulties now being experienced by the political leaders in learning enough of the situation to determine how they may be able to increase coal-mine employment and be rewarded by grateful voters may bring home to those who have influence in legislative matters the need for additional appropriations for coal statistics, or at least statutory authority which would allow government bureaus to receive contributions from the industry for the purpose of augmenting the funds which they have at their disposal for statistical purposes.

In reporting on the application of the Coal River & Eastern Ry. for permission to extend its line to Prenter, W. Va., a distance of 11 miles, Interstate Commerce Commission Examiner C. E. Boles advised against granting the application.

152 Miners Killed in Mine Accidents in July; 7 Months Total Is 1,458

Accidents at coal mines in the United States during July, 1924, caused the death of 152 men, or 58 less than the number killed in July, 1923, according to information received from state mine inspectors by the U. S. Bureau of Mines. The production of coal during the month was 40,066,000 tons; hence the fatality rate was 3.79 per million tons of coal mined. This rate is lower than that for the preceding month (4.22) as well as for July last year (3.92), and it is about 10 per cent lower than the average rate (4.20) for July during the ten-year period 1914-1923. For bituminous mines alone the reports showed 112 deaths and a fatality rate of 3.47 per million tons, as compared with a rate of 3.55 for July last year and a ten-year average rate of 3.82. For anthracite mines alone, the number of fatalities in July, 1924, was 40 and the fatality rate was 5.14, as compared with 6.01 for July last year and a ten-year average rate of 6.36.

The accidents during July brought the total number of fatalities during the first seven months of 1924 to 1,458, as compared with 1,478 during the corresponding months last year. Because of the explosions during the present year and the lower output of coal, the fatality rate for 1924 to the end of

Dominion Coal Co. Plans Equipment Financing

The directors of the British Empire Steel Corporation are seeking authority from the preferred shareholders of the Dominion Coal Co., a subsidiary, for an issue of \$15,000,000 of the coal company's bonds to provide further working capital and equipment, according to advices from Montreal. The new bond issue would be used to refund the \$4,988,000 outstanding bonds and provide \$5,000,000 to meet the existing indebtedness due to capital expenditures, and the balance would be issued from time to time for further capital expenditures.

When the preferred stock of the Dominion company was issued in 1905 it was provided that no new mortgage could be placed on the properties without the consent of 51 per cent of its stockholders. The president states that the new issue will put the shareholders in an advantageous position for the resumption of dividends.

July was 4.65 per million tons, about 19 per cent higher than the corresponding rate (3.91) last year. The increase in the fatality rate was entirely in the bituminous industry, as the rate for anthracite mines actually declined from 5.66 to 5.49, while that for bituminous mines rose from 3.58 to 4.48.

Tardy Coal Buyers May Run Afoul of Car Shortage

While the railroads of the country appear to be in excellent condition to handle the fall crop movement, in the opinion of Secretary Hoover, there may be more or less slight conflict with coal movement, the Secretary stated last week in discussing the subject, owing to the fact that many consumers appear to have disregarded the advice to lay in their stocks during the summer. The Secretary, however, did not predict a car shortage as a certainty, touching upon the subject only in a general discussion.

The Department of Commerce issued its appeal to fuel consumers three months ago to lay in their winter supplies of coal during the summer months, Secretary Hoover said, in order to forestall congestion in transportation when cold weather arrived, in order to level operating time at the mines and in order that consumers might benefit from the lower prices of summer. If a car shortage develops, it inevitably means higher prices for coal, he pointed out. Coal this summer has been cheaper than since 1916, Secretary Hoover said, adding that in his opinion some bituminous coal has been sold at a loss. The advice to stock during the summer was heeded by many consumers, the Secretary said, but was disregarded by many more, as evidenced by the fact that coal production this summer has been at the lowest rate in years.

Coal-Mine Fatalities During July, 1924, by Causes and States

(Compiled by Bureau of Mines and Published by Coal Age)

State	Underground								Shaft				Surface						Total by States								
	Falls of roof (coal, rock, etc.).	Falls of face or pillar coal.	Mine cars and locomotives.	Explosion of gas or coal-dust.	Explosives.	Suffocation from mine gases.	Electricity.	Animals.	Mining machines.	Mine fires (burned, suffocated, etc.).	Other causes.	Total.	Falling down shafts or slopes.	Objects falling down shafts or slopes.	Cage, skip, or bucket.	Other causes.	Total.	Mine cars and mine locomotives.	Electricity.	Machinery.	Boiler explosions or bursting steam pipes.	Railway cars and locomotives.	Other causes.	Total.	1924	1923	
Alabama	5			1								7													7	4	
Alaska																									0	0	
Arkansas	1											1													0	0	
Colorado		1	2									3													1	8	
Illinois	1		5	5								11													11	12	
Indiana	2											3													3	7	
Iowa																									0	0	
Kansas																									0	1	
Kentucky	1											1													1	13	
Maryland																									0	0	
Michigan																									0	3	
Missouri																									0	2	
Montana			1									1													0	2	
New Mexico	1											1													1	0	
North Dakota																									0	0	
Ohio	6		2									8													8	12	
Oklahoma																									0	0	
Pennsylvania (bituminous)	14	4	2	16			2				1	33		1			1						2	2	35	48	
South Dakota																									0	0	
Tennessee					1							1													0	0	
Texas																									0	0	
Utah	1											1													0	0	
Virginia	4		2									6													6	3	
Washington	1	1		1								3													1	1	
West Virginia	13	1	7		2		3					26								1			2	28	42		
Wyoming	1											1													1	5	
Total (bituminous)	51	7	21	17	3	7					1	107		1			1		1				3	4	112	160	
Pennsylvania (anthracite)	16	1	4	*1	8							7											2	3	40	50	
Total, July, 1924	67	8	25	18	11	7					8	144		1			1		1				5	7	152		
Total, July, 1923	98	18	43	5	8	10	1	2			7	192	3		4		7		3	1	1		2	4	11		210

*Gas explosion.

Scotts Run Mines Resume On Open-Shop Basis

The Brady-Warner Coal Corporation last week posted a notice announcing that operations at Osage mines No. 1 and No. 2, near Morgantown, W. Va., in the Scotts Run field, would be resumed Tuesday, Sept. 2, under the 1917 wage scale. It has been stated that the mines will be run on an open-shop basis. The Osage mines are rated as having a capacity of 1,600 tons daily and it is stated that this can be increased to 2,000 if necessary. The company has 67 miners' houses at the mines, 62 of which are now occupied by miners formerly in the employ of the company, before it closed its Osage plants last spring after declining to renew its agreement with the union. It is stated by Superintendent Warren Cook that the order calls for the miners either to go back to work or else vacate the company houses.

The 1917 wage scale calls for 63c. a ton for room coal and 69c. for entry coal. The scale for drivers and motormen is \$4.52 for eight hours, although at one time the operators gave these men \$1 more.

The agreement between the company and the miners now occupying the houses belonging to it stipulates that if for any reason whatsoever the coal company desires the houses in which the miners live, the miners must vacate on five days' notice, but if the miners leave the employment of the company or are discharged they may be removed at once.

It has been predicted by various coal operators in the Monongalia field that if the Brady-Warner corporation opened its mines at Osage on the open-shop basis several other mines along Scotts Run now closed would open on the same basis.

Officials of the United Mine Workers in the Monongalia field declare that they will remain in the field until it is organized 100 per cent for the union.

Keen Competition Marks Bids On Navy Coal

Keen competition marked the bidding on 8,000 tons run-of-mine bituminous coal for delivery at the navy supply depot, South Brooklyn, N. Y., between October and May next. Proposals were opened by the Bureau of Supplies and Accounts of the Navy Department, at Washington, Aug. 29, when twenty-one bids were received, as follows:

A. K. Althouse Co., Philadelphia, \$5.34 per ton; W. H. Bradford & Co., Philadelphia, \$5.42; Brinker Coal Co., Johnstown, Pa., \$5.81; Davis Coal & Coke Co., Baltimore, \$6.05; Dexter-Carpenter Coal Co., Inc., New York, \$5.57; Eastern Fuel Co., Pittsburgh, \$5.55; Empire Coal Mining Co., Philadelphia, \$6.03; Fallen Timber Co., New York, \$5.35; Fidelity Coal Mining Co., Philadelphia, \$5.65; H. B. W. Haff, New York, \$5.92; George D. Harris & Co., New York, \$5.98, alternate bids \$5.71 and \$6.05; Imperial Coal Corporation, New York, \$5.97; W. A. Marshall Co., New York, \$5.93, alternate bid \$6.16; Morrisdale Coal



C. P. White

New head of the coal division of the Department of Commerce. Mr. White's wide experience and knowledge of the coal industry are expected to be of great help in building up the influence of the division.

Co., Philadelphia, \$5.87; Pattison & Bowns, Inc., New York, \$5.94; Patton Coal Co., Fairmont, W. Va., \$5.99; Seaboard Fuel Corporation, Philadelphia, \$5.99; J. Tatnell Lea & Co., Philadelphia, \$5.49; Titan Fuel Corporation, New York, \$5.88; Weston, Dodson Co., Inc., Bethlehem, Pa., \$5.98; West Virginia Coal & Coke Co., Elkins, \$5.68.

Steel Industry Speeds Up

Not since the early days of the year has steel demand been so brisk as it is now. Plans are announced for the reopening of mills and furnaces and the prospect is bright.

There is every indication that one of those rare periods in which all the railroads seem to turn buyers at the same time is in prospect. There is already in the market inquiry for between 150,000 and 200,000 tons of rails, and at least 250,000 tons of business is expected to be realized in the next few days. Southwestern roads thus far have done most of the shopping, although Eastern lines are beginning to come in. As yet the Western roads have not come into the market.

One of the best indications of the trend is the announcement that the United States Steel Corporation will reopen the largest rail mill in the world, located at Gary, the day after Labor Day. This mill has been idle for two months.

The railroads are not the only present buyers, however. Practically every consumer of steel products, with the single exception of automobile builders, is in the market with a buying zest that has not been experienced for some time. Farm implement makers are especially active, and considerable tonnage is being taken by makers of tanks and stoves.

Chemists to Discuss Fuels At Cornell University

In the issue of Aug. 21, p. 263, *Coal Age* published an account of the meeting of the American Chemical Society to be held at Cornell University, Sept. 8-13. The program has been revised and lengthened, as follows:

Wednesday afternoon, Sept. 10, Rockefeller Hall—(1) F. W. Stevens, "The Rate of Flame Propagation and the Mass Law" (lantern); (2) R. T. Haslam, W. G. Lovell and R. D. Hunneman, "Radiation from Nonluminous Flames" (lantern); (3) F. W. Sperr, Jr., "The Present Trend of the Manufactured Gas Industry"; (4) N. H. Memory, "Notes on Continuous Vertical Retorts"; (5) R. T. Haslam, F. T. Entwistle and W. E. Gladding, "Reactions in the Fuel Bed" (lantern); (6) R. T. Haslam and E. L. Chappell, "The Measurement of Temperature of Flowing Gases" (lantern); (7) T. E. Layng and W. S. Hathorne, "The Determination of the Temperatures of Plasticity, Maximum Pressures and Solidification of Coking Coals" (lantern); (8) H. J. Rose and G. G. Desy, "Composition of the Volatile Matter Obtainable from Coke" (lantern); (9) T. E. Layng and W. S. Hathorne, "An Examination of the Methods of Analysis of Fuel Gas" (lantern); (10) E. C. Freeland and W. G. Harry, "The Use of Alcohol and Alcohol-Ether Mixtures as Motor Fuels"; (11) S. W. Parr and W. R. King, Jr., "The Density of Carbon Dioxide with a Table of Recalculated Values" (lantern); (12) Jerome J. Morgan and Merl H. Meighan, "An Investigation of the Caustic Soda Process of Extracting Low-Temperature Phenols."

Thursday afternoon, Sept. 11, Storage of Coal and Spontaneous Combustion; S. W. Parr, Chairman—Discussion started by (1) S. W. Parr and R. T. Milner, "The Oxidation of Coal at Storage Temperatures" (lantern); (2) S. W. Parr and E. R. Hilgard, "The Oxidation of Sulphur as a Factor in the Storage of Coal" (lantern); (3) S. W. Parr and C. C. Coons, "Carbon Dioxide as an Index of the Critical Oxidation Temperature for Coal in Storage" (lantern); (4) S. W. Parr, "Deterioration and Spontaneous Combustion of Coal in Storage" (lantern); (5) N. R. Beagle, "Deterioration of Midwest Coals under Different Storage Conditions—Effect on Burning Qualities"; (6) J. D. Davis and John F. Byrne, "Spontaneous Combustion of Coal—Characteristics Shown by an Adiabatic Calorimeter" (lantern).

The coal consumed by different manufacturing enterprises during 1923, as shown by the Department of Commerce, is as follows: Watchcase manufacture, 16,427 tons; baking powder and yeast, 246,963 tons; boot and shoe findings, 25,626 tons; bicycles, 25,505 tons; phonographs, 158,047 tons; motorcycles, 12,504 tons; glue and gelatine, 424,845 tons; paper bags, 19,641 tons; engraving plate printing, 3,100 tons; engravers' materials, 910 tons; cast-iron pipe and fittings, 170,497 tons; leather belting, 9,604 tons.

Urge Safety Inspector for Each Anthracite Colliery

Scranton, Pa., Aug. 29.—A safety inspector for every colliery in the anthracite region is the desire of the Anthracite Safety Council as expressed in resolution form at a meeting in the Glen Alden Coal Co. offices in this city on Aug. 27. Copies of the resolution indicating the attitude of the council are to be printed and mailed to every operation in the region.

The resolution which provides for the safety inspectors specifies that the man appointed to such a position at each colliery must have had at least ten years experience in mining. He is to have authority to enforce discipline relative to mine laws and company rules. At the end of each work day the safety inspector will meet with the colliery superintendent, mine foreman, or assistants and representatives of the miners to discuss local conditions, according to the resolution. The inspectors would be paid by the coal companies.

P. J. Moore, state mine inspector for the Second District, presided at the meeting of the safety council. John R. Bryden, of the Pancoast Coal Co., acted as secretary. Others in attendance were August McDade, Jenkin T. Reese and Llewellyn Evans, state mine inspectors; T. J. Williams, of the Glen Alden Coal Co.; H. T. McMillan and J. Palmer, of the Pennsylvania Coal Co.; John Corcoran and Thomas Shrive, of the Jermyn Coal Co.; Morgan Davis, of the Mt. Jessup Coal Co., and James Gleason representing the United Mine Workers. The miners' local unions are to receive copies of the resolution and consider the advisability of the adoption of such a move.

The meeting was the third within the past three months for the purpose of devising ways and means of reducing fatal as well as minor accidents at the mines.

Conciliation Board Urges \$5 Scale in Alberta

The report of the Board of Conciliation appointed under the Industrial Disputes Act to investigate the dispute between the coal operators of northern Alberta and the Edmonton and District Mining Federation recommends the following scale of wages:

Miners on company work, \$5 for an eight-hour day; brushers, track layers, drivers and chief cager, also \$5 a day; pushers and assistant cagers, \$4.50 a day; coupler (under 18 years), \$3.50 a day; assistant track layer, \$3.50 a day; boys under 18 on surface, 35c. an hour; outside labor, 50c. an hour; blacksmith, 65c. an hour.

The miners asked \$5.60 per day. The operators in the dispute were prepared to pay \$5 per day.

The board recommended that contract rates in the different mines be continued as they were in the agreement that expired on June 30, 1924, with provision for no overcrowding of contract miners during busy seasons.

Some of the independent mines in Alberta are now working, having effected an agreement with their men, and are shipping coal to Winnipeg.

H. F. Randolph, Well Known Electrical Engineer, Dies

Harry Fitz Randolph, widely known in the coal industry as an electrical engineer, died at Mt. Hope, W. Va., Aug. 23, 1924. He was born at Johnstown, Pa., in 1871, and was educated at Swarthmore College and Johns Hopkins University. After graduation he immediately entered the students' course of the General Electric Co., Schenectady, N. Y., and after completing the three years' work required, was employed by the Yough River Coal Co. at Scott Haven, Pa., as chief electrician. When this company was merged with the other constituent companies forming the Pittsburgh Coal Co.



Harry Fitz Randolph

Mr. Randolph was retained as electrical engineer. He was later made assistant manager of mines, which position he retained until 1910, when he went into consulting work with George Wood as the Wood-Randolph Co. at Pittsburgh, Pa. Reorganization in 1912 changed the name to the Randolph-Means Co., which arrangement endured until 1917, since which time he had maintained an engineering organization under the name of Harry F. Randolph. During his professional career Mr. Randolph was retained by many large coal mining corporations throughout the country, notably the New River Co., Macdonald, W. Va.; H. C. Frick Coke Co.; Logan County Coal Corporation, Lundale, W. Va.; Wayne Coal Co. and Union Collieries Co. He had also been retained by the Department of Mines of Pennsylvania, Department of Mines of West Virginia and Federal Bureau of Mines.

Escaped Johnstown Flood

He was a survivor of the Johnstown flood in 1889, in which his oldest brother was lost. Mr. Randolph was a member of the Engineers Society of Western Pennsylvania, the American Mining Congress, the American Institute of Electrical Engineers and other scientific organizations.

Brophy Scoffs at Plan For Prosperity Through Less Money for Miners

"Give the miners less money and make their community more prosperous! This is, in substance, the theory many coal operators are now advancing, by the constant issuance of 'wage adjustment' propaganda. This is especially true of Central Pennsylvania Operators, Charles O'Neil acting as their press agent," said John Brophy, president of District 2 (central Pennsylvania), in commenting on the statement issued by Mr. O'Neil following the meeting of central Pennsylvania operators, at Altoona, Aug. 22.

"Coal production has been at the lowest level in years," said Mr. Brophy. "Consumers are not buying coal. Operators are not able to sell coal at any price because consumers do not want coal and will not buy it until they need it. Coal prices are now down to the lowest point in many years, still there is very little market."

"The reason for the operators' frantic efforts to set aside the present contract is therefore obvious to any one who dares to look into the matter. They are seeking to bring about a wage reduction when business is poor, so that when business improves and they are able to sell their coal they will make larger profits by reason of the reduction in wages to their employees."

"Mr. O'Neil's statement quotes many figures. He has counted up every hole in the ground that ever produced a bucket of coal and employed a couple of men to get his grand total of idle mines in District No. 2. The U. S. Geological Survey figures are just as reliable as Mr. O'Neil's (with the odds in favor of the Survey). If the Survey does not report the number of idle mines in the union fields, neither does it report the number of idle mines in the non-union fields, which fact Mr. O'Neil carefully fails to state."

"Mr. O'Neil is very much in error when he quotes the district officers as saying that the International officers are responsible for high wages in the union fields and low wages in the non-union fields. The International and the district officers are in complete accord on the wage question and I have told them that wage reduction is not a remedy for slack work; that wage reductions in the union fields mean further reductions in the non-union fields, and the result is no change in the relative position of the different districts, but it does mean less earnings and more poverty for the miners. The operators would not be benefited, but the mining communities would suffer more because the miners would suffer more."

"In March the operators were voluntary signers to an agreement for a three-year period. The ink of their signatures was scarcely dry before they started what might be termed an 'educational campaign' through the newspapers to sell the wage-reduction idea."

"The United Mine Workers have not been deceived by these specious arguments, but knowing their fallacy, intend to hold the operators to the Jacksonville agreement."

Western Kentucky Mines Unable to Open On Non-Union Basis

Scheme Proves Abortive When Miners Stay Away—Failure of "Invitation" to Workers Attributed to Garbled Story in Louisville Newspaper—Plan Called Fight Against Union

Efforts of the western Kentucky coal operators to reopen the mines in the strike zone of District 23, on Aug. 25 failed completely. No workers showed up when the mine whistles were blown, following posted notices and letters mailed to the workers. Reports indicate that at most of the mines no men reported for work, groups forming in some cases to see whether there would be anyone reporting. Indications are that some workers would have reported except for fear of personal violence.

Operators of the section assert that the effort was largely frustrated through the activity of a Louisville newspaper, which got wind of the plan, obtained a garbled report, and came out with a headline article indicating that the operators had arranged to fight the miners and the union. It is asserted that when copies of the paper reached the central Kentucky district the workers went up in the air, and the good work of months was destroyed immediately, as the story merely made the workers mad. The word "fight" as used indicated to workers that an effort would be made to run, to destroy the union, import non-union men, and use every legal effort, even to guns and bayonets, if necessary.

The operators merely offered the 1917 wage scale and an opportunity to work if the strikers desired to do so. It was felt that after more than four months of idleness many workers would be glad of a chance to return to work, especially in view of the fact that there has been a considerable amount of complaint over strike benefits paid by the union.

The operators have steadfastly endeavored to show the workers that the Jacksonville agreement was to the detriment of the west Kentucky field and that the field could not operate profitably on any such basis, give its workers steady work, and keep out of the sheriff's hands. An effort also has been made to indicate to the workers that they were being used to aid in forcing an agreement that would help the Illinois, Ohio and Northern operating sections in maintaining union gains, but which would mean idleness for western Kentucky except in periods of shortage and high prices.

The argument is made that at the Jacksonville conference it was openly stated that there were 200,000 too many miners in the country, too many mines, too much potential capacity, etc. The only way to better conditions for the national organization would naturally be to eliminate a lot of workers, and some of the smaller fields such as west Kentucky.

It is rumored in the field that the International has supplied only about \$7,500 in the way of strike benefits other than a fund of around \$50,000 loaned to District 23 and to be paid back later on, although the district

union has been in operation for many years and has paid large sums into the coffers of the International.

Just what the next move will be is a question. Apparently workers are of the opinion that with fall business close at hand the operators were bluffing in offering the 1917 scale and will make a better proposition later. There is a possible chance that the operators will modify their offer and propose the 25 per cent reduction that was offered at Louisville five months ago. It seems that some of the workers objected especially to the fact that the recent offer was not as good as that previously made, but the previous offer was made on the understanding that the mines would not close down.

Eviction proceedings have been started in some sections of the field at mines that have been able to resume with part of their old forces and which are now endeavoring to rid their camps of strikers who refuse to return to work.

It is reported from Henderson, Ky., that practically all of the mines in that county are again running, and on a non-union basis, the Southland Mining Co. having started on Aug. 21, with thirty men, working one section, almost twice that number reporting for work.

The eleven mines of the St. Bernard Mining Co. are all reported to be on a working basis now—non-union with an employees' benefit association—although they are getting only 40 per cent running time. These mines were turned non-union after they were absorbed by the West Kentucky Coal Co.

Safety Council Has Meat For All Comers

Last week *Coal Age* detailed the program of the Mining Section of the National Safety Council Congress, to be held at the Hotels Brown and Seelbach, Louisville, Ky., Sept. 29 to Oct. 3. Reference also was made to the annual business meeting. However, there are some other meetings that have relevance to coal-mine operation which were omitted, namely, some general sessions and those of the health service and plant-publication sections.

At 2 o'clock Wednesday afternoon C. F. N. Schram, M.D., medical director, Fairbanks, Morse & Co., Beloit, Wis., will discuss "Industrial Health as a Purchasable Commodity"; Mrs. Frank B. Gilbreth, Montclair, N. J., "The Fatigue Problem in Industry"; A. W. Colcord, M.D., Carnegie Steel Co., Clairton, Pa., "The Health Education of Our Foreign Families"; C. L. Ferguson, M.D., Selby Shoe Co., "How to Make a Sanitary Survey of an Industrial Plant," and A. D. Pacini, M.D., Chicago, Ill., "Physiotherapy and Physical Reconstruction."

On Thursday morning at 10 o'clock the employees' benefit association section will hold a session at which Dr. A. H. Ryan, professor of physiology, Tufts College, Mass., will discuss "Benefit Associations—Their Need, Scope and Possibilities"; J. E. Culliney, safety engineer, Bethlehem Steel Co., Bethlehem, Pa., will answer the question "Should the Management Have Anything to Say in the Running of a Mutual Benefit Association?" and Dr. Wade Wright, assistant medical director, Metropolitan Life Insurance Co., will consider the problem "Should Medical Service of a Mutual Benefit Society Extend Beyond the Work Done in the Plant?"

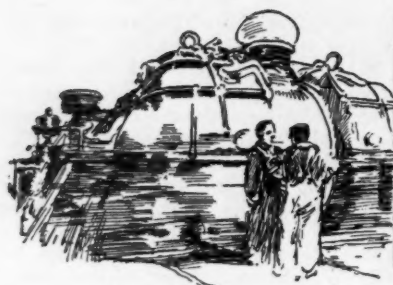
In the afternoon at 2 o'clock Dean K. Brundage, U. S. Public Health Service, Washington, D. C., will address the employees' benefit associations section on "Statistical Analysis of Sick Benefit Association Records," and Albert B. Tenney, president, Malden Electric Co., Malden, Mass., will discuss the question "Should Physical Examination Be Compulsory to the Members of a Mutual Benefit Association?"

A general session will be held Thursday afternoon at which C. B. Auel, Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., will discuss "Accident Records and How to Keep Them"; Frank Morris, Liberty Mutual Insurance Co., Boston, Mass., will address the audience on "Safety Committees Will Starve Unless Fed"; R. T. Solensten, bulletin editor, National Safety Council, will describe "How to Advertise the Big Idea"; H. O. Houze, personnel manager, National Malleable & Steel Casting Co. will show how to educate the workman, and Sydney W. Ashe, General Electric Co., Pittsfield, Mass., will detail "Personal Experiences with the Prone-Pressure Method."

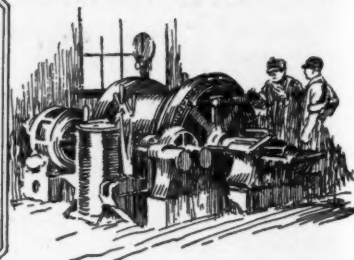
On Tuesday evening both ladies and gentlemen will have a jollification party entitled "The Frolics of 1924," and on Thursday evening will be held the annual banquet with Herbert C. Hoover, Secretary of Commerce, as principal speaker, and an address on "The Responsibility of Leadership," by Dr. Augustus Dyer, Vanderbilt University, Nashville, Tenn. All these meetings will be at the Hotel Brown.

Nothing has been said as to the plant publications section, which meets in two sessions on Thursday, or the public utilities section, so near akin to the mining section, that meets on Tuesday, Wednesday and Thursday mornings, or as to many other sections of less interest to the industry. The plant publications section gives three prizes to the three best employees' magazines, of which there are more than three hundred, and to the companies presenting the best safety posters.

Seven motion pictures will be shown daily from 1 to 2 p.m. in the Hotel Brown, among others being "When a Man's a Miner," produced by the Bureau of Mines. Eighteen manufacturing concerns will exhibit safety appliances in the Hawaiian Building, opposite the Hotel Brown. It is probable that other mining meetings will be held to arouse an interest in safety in the west Kentucky field similar to those held in St. Louis recently.



Practical Pointers For Electrical And Mechanical Men



Motors Successfully Dried Out After Five Days Under Water

Although Submerged in Water All the Important Electrical Equipment
Was Dried and Again Placed in Service Without a Mishap
—One Motor Was Dried Electrically

AFTER being completely under water for a period of five days, five 1,000-hp. pump motors in the main pumproom of the Glen Alden Coal Co., in Scranton, Pa., were successfully dried and placed back in service.

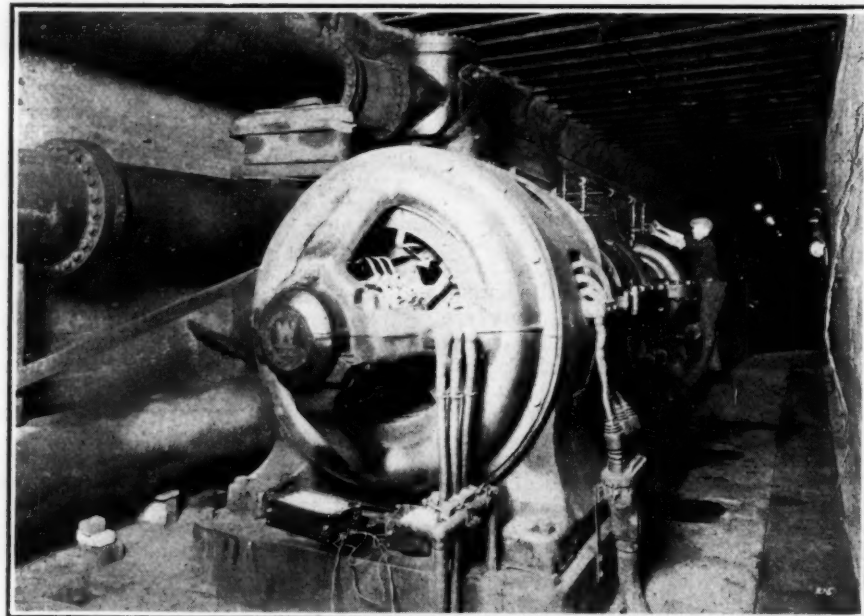
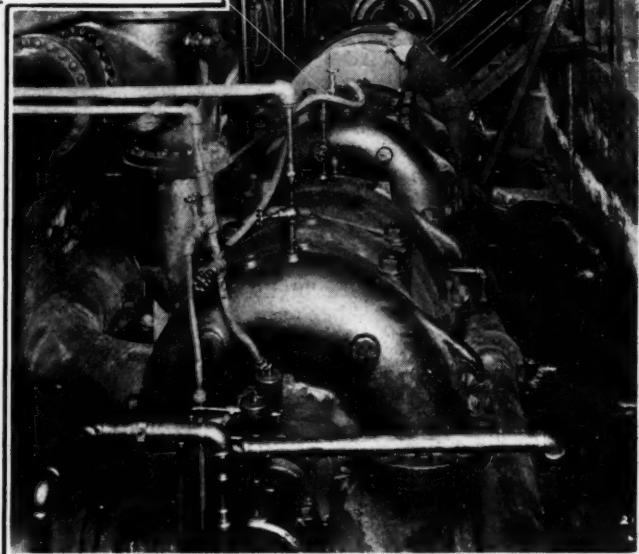
A flood from the Lackawanna River entered one of the collieries at the rate of 700,000 gal. per minute. The Hampton Water Shaft Pumping Station served this draining area with five centrifugal pumps, each driven by a 1,000-hp., 2,200-volt, three-phase, 60-cycle, 870-r.p.m. induction motor, four of which were Westinghouse motors.

In spite of the large capacity of the pumps, at the end of six hours, the pumps and motors were completely submerged. The water finally rose about 25 ft. over the tops of the motors.

It was five days before any of the pumps could be reached, and the pumps and motors were found half buried in mud and silt, several hundred tons of which had to be removed before any

Large Pumproom

After the water was lowered, workmen entered the pumproom and found the pumps and electrical equipment half buried in mud and silt. The motors had been in water five days, yet, when carefully dried out, all five motors were put back in service and gave no trouble. Note the large discharge pipes and how they were reinforced after the flood.



Some of the Largest Centrifugal Mine Pumps in the Coal Field Are Located in the Hampton Pumping Station

At this pumproom all the water from five mines and most from three other mines is pumped to the surface. Each pump is driven by a 1,000-hp. alternating-current motor. This illustration shows the pumps in service after the flood. The pumproom is the largest in the mining field. Power is supplied from one of the company's big generating plants located nearby. Incidentally, much of the mine water is used for cooling purposes in the power house.

of the pumps could be placed in operation. One by one the motors were disengaged from the pumps and taken outside, with the exception of one motor on the pump farthest from the entrance to the pumproom.

These motors were disassembled, cleaned off with a fire hose, and dried in a temporary wooden inclosure built around them. This housing was open at the bottom and ventilated at the top, and a temperature of 90 deg. C. was maintained by circulating steam through coils of pipes inside the inclosure. This arrangement required little attention and gave a constant temperature.

The motors were dried in periods ranging from seven to eleven days until insulation resistance measurements showed a constant value for a period of twenty-four hours or longer. After being thoroughly cleaned out, painted, and the swollen slot wedges trimmed, the rotor windings were put back and the motors placed in operation again. They have been in service since that time and have given no trouble.

One motor which was left inside the mine was covered with a wooden house and dried by Westinghouse space heaters. Small fans gave the necessary ventilation. This job required closer attention and took longer to dry than

the other motors, but it obviated the necessity of taking the motor outside.

The starting panels, oil switches, and all other apparatus were put in service after being cleaned and dried by blow torches and space heaters. The only failure of the entire outfit was a short piece of cable stretching from a bus-bar to one of the oil switches.

Electrical Forge Saves Workman's Time

Anyone who has ever worked around an underground repair shop has no doubt often realized how inconvenient it is to make a repair when some part of the material had to be heated. Usually the workman finds that the part must be taken outside to the blacksmith shop.

If the mine has only one shaft it is frequently necessary to wait until the trammers can stop the hoisting of coal to let the workman get to the surface. Even when the material reaches the blacksmith shop there is often further delay if other work is being done in the fire.

NO NEED TO BUILD FIRE

Repairs which must be made at night when the blacksmith's fire is out and a new fire must be started, and, moreover, by someone inexperienced with the forge, cause many troubles and dangers. Usually when the blacksmith comes to work the next morning he finds things misplaced, thus effectively lowering the efficiency and morale of the shop. Aside from these difficulties the losses occasioned by delays to the workmen and equipment can never be retrieved.

At the J. K. Dering Coal Co. mine, at Eldorado, Ill., the inside workmen who repair locomotives, cutting machines and other mine equipment have often felt the need for some means of heating bent bolts and small machine parts. Old methods didn't suit them; when mining machinery has to be repaired all the work must be done quickly. When a man is under a locomotive it is no easy matter to crawl

from under it and back again for every little detail; this wastes time. While an assistant is going outside to heat and straighten a bolt, no man is going to wait in a cramped position in a dark, and sometimes wet, motor pit.

To obviate these delays and difficulties the workmen employed in the repair shop near the foot of the shaft at this mine have built their own forge. The unusual thing about it is that it operates by electricity supplied from the main trolley circuit. Every precaution has been taken to make it as safe as possible and in this respect it is different from most contraptions designed in coal mines.

FREE FROM GAS AND SMOKE

When not in service the forge generates no gas or smoke to fill the workshop and make things disagreeable. It stands in a separate little room to the side of the shop.

The essential part of this forge is a barrel filled with salt water and provided with necessary protective equipment. The barrel is mounted on an insulated platform upon which the workman stands and keeps himself free from ground connections. The positive conductor from the trolley circuit first passes through a disconnecting switch located near the forge. On the end of this lead a metal plate has been fastened and placed in the bottom of the barrel. The negative conductor is attached to an insulated busbar fastened to the top of the barrel.

By insulating the platform from the ground and also insulating the negative conductor from all parts of the forge the whole equipment is made relatively safe. A workman standing on the platform does not get a shock if he touches the positive conductor. Only when the man touches the positive lead and the negative conductor directly would he get a shock.

ROD ELECTRICALLY HEATED

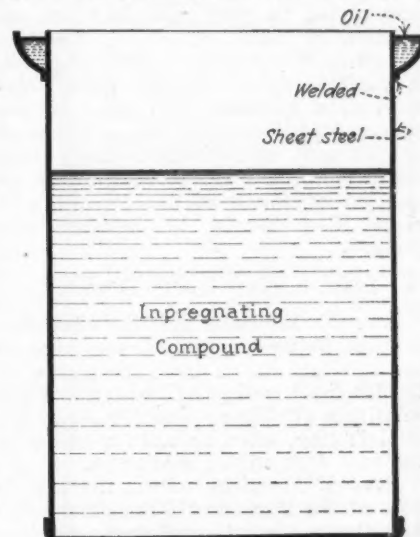
Whenever a piece of metal, usually a bolt or rod, is to be straightened the workman holds one end of it in his hand or in a pair of tongs and lays it upon the busbar in such a manner that

the end to be heated can be lowered into contact with the salt solution. As soon as the metal touches the salt water the current flows from the positive conductor into the solution, then through the rod up to the busbar and to ground. The end of the rod quickly heats and a few blows with a hammer straightens it. In this way parts needing repair which would ordinarily be thrown away are often made as good as new and frequently broken parts are heated so that they can be welded together after being heated and thus easily repaired.

Oil-Sealed Tank Prevents Compound from Drying

One of the greatest difficulties in an electrical repair shop is to keep the impregnating compound from drying overnight or from day to day.

The Madison Coal Corporation, of Illinois, makes most of its electrical repairs at its Glen Carbon plant. "Last year the shop effected a saving of over \$5,000 in labor and material by making nearly all its own armature and field coils and repairing its electrical apparatus," says Joseph Long, assistant general superintendent of the company.



Self-Sealing Tank

A reservoir extends completely around the outside of the tank containing the impregnating compound. By excluding the outside air only a little of the compound ever dries or thickens.

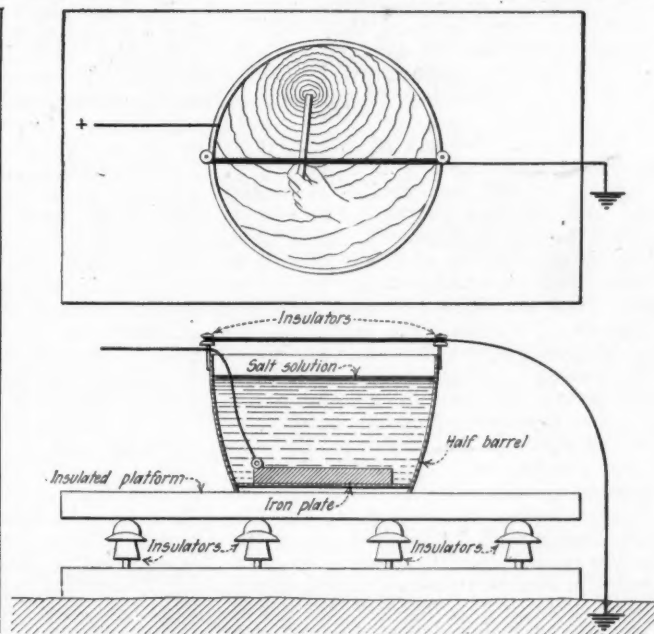
The shop is equipped with many modern coil-winding and electric repairing machines.

This company has designed an oil-sealed tank. When parts soaked with impregnating compounds are placed in this tank they are airtight and so protected from drying. This airtightness is obtained by welding a ring-shaped reservoir at the top of the tank and filling it with oil. When the cover is put in place the edge extends into the oil, and this traps the air in the tank and prevents its circulation and the entrance of other air.

The tank stands in a handy place in the shop where a large armature or a number of coils may be easily dipped and carried to a baking oven located in a small addition to the building.

Electric Mine Forge

Machine parts which must be heated are placed in contact with the negative busbar on the barrel and the salt water solution. A forge like this never smokes or generates gas. It is used on a 250-volt trolley circuit.



Discussion

Ten per Cent of Rock Dust May Raise Ash Percentage to Required Figure

Dr. Wheeler Did Not Say That Ten per Cent of Inert Material Would Suffice—Size of Coal Dust More Potent Than Is Fuel Ratio

BY GEORGE S. RICE

Chief Engineer, Bureau of Mines, Washington, D. C.

THE thoughtful letter of John Walls, of Ensley, Ala., relative to rock dusting and watering, in your issue of Aug. 7, appears to call for some reply from me, as he refers to certain statements I have made.

First, regarding the statement attributed to Dr. Wheeler that an addition of 10 per cent of rock dust is well worth seeking, I feel sure, from my conversations with Dr. Wheeler, that he had in mind not 10 per cent of rock dust added to pure coal dust but its addition to road dust already containing 30 to 40 per cent of inert material, in which is included both ash and moisture. He intended to convey to his hearers the idea that the addition of 10 per cent of artificially made rock dust would make it improbable that an ignition of the road dust would take place if a source of ignition was present.

INVOLUNTARY ROCK DUSTING

It is characteristic that the road dust in most British mines will run high in ash content, due to the general use of the longwall method of mining and the relatively friable roof material, which, by dribbling, often becomes mixed with the coal dust on the roadways.

Even in American mines, the experience of the Bureau of Mines, from taking thousands of road-dust, rib-dust and timber-dust samples, is that the ash plus moisture content in certain places, for example near partings, rarely is less than 25 or 30 per cent.

I hope that this will make it clear to the correspondent that there was no thought in the mind of Dr. Wheeler that 10 per cent of rock dust added to a pure coal dust which would give less than 20 per cent of inert matter in the mixture would be of the slightest avail in preventing ignition or propagation.

As concerns the second point, the effect of the ratio of volatile matter on the relative explosibility of a coal dust, the correspondent has a generally correct idea of this but he must take into account two factors profoundly modifying explosibility:

(a) Some coals, like the splint coals of West Virginia and the subbituminous coals of the West, break into naturally coarse, more or less cubical particles. Other coals, such as the Pittsburgh district and the Pocahontas field coals, break down into structureless particles. In the former, a person

can go into the mine and come out relatively clean, but in the second coal, with the same amount of exposure, he gets quite black. Henry Walker, Chief Inspector of Mines of Great Britain, remarked to me that when he got very black in inspecting a mine, he told the management to look out for dangerous dust conditions.

HAVE 40 PER CENT 200-MESH DUST

(b) As to the quantity of the finest dust present in the rock dust or rib dust, it is the percentage of dust passing through a 200-mesh, which the Bureau has found is the best index of the danger of a bituminous dust, and this in the average sample ranges from 10 in the less dangerous dust to rarely over 40 per cent for the more dangerous dust. When coal is pulverized, so that practically all of it passes through 200-mesh, it responds almost directly in sensitiveness to the volatile-total combustible ratio, but the influence of the two factors already described may be superior to a difference in percentage of volatile matter. The effect of the coarser particles in the average mine dust makes the British permitted limit of 50 per cent in any part of the roadways a safe limit, as it must never be forgotten that this refers to the extreme limit and when a sample shows more than 50 per cent combustible, that locality must be rock dusted afresh. Also, you may be sure that, with a 50-per cent limit, the average analysis of road dust in that mine will show at least 60 and probably 70 per cent of inert material.

As regards the use of water, it is admitted that there is a difference of opinion on the application of water. Dr. Wheeler has proposed the use of water in combination with rock dust, but his explanation of this is that there must then be enough water to render the mixture incapable of ignition. However, this does not represent the requirement of the British law. We of the Bureau of Mines believe that there are grave dangers in a combination process through which by wetting, or use of water in the roadways, the rock dust is caked so it will not be brought into suspension by a concussion and thus neutralize the coal dust; and also the making of fresh dust along the roadways, which in general is more rapid in American mines than in European mines, due to our high-speed haulage, may thus deposit this coal dust

on top of the caked dust in sufficient quantity to ignite or to propagate an explosion.

On the third question raised by Mr. Walls, concerning the recommendation which I made for watering at the face, more especially in connection with cutter-bar machines, my views on this point are that it will help to lay the dust, as it is formed, and when loaded wet on the cars it will not be blown off as dry coal dust is, increasing the percentage of combustible along the roadway. There is another great advantage in watering at the face, that the miners do not have to breathe so much dust. This makes for their comfort.

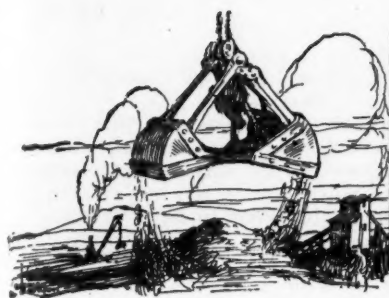
A fourth point not brought up by Mr. Walls, but in another paper in the same issue of *Coal Age* and referred to in the editorial, concerns the moisture in the air increasing the violence of a gas or gas and dust explosion. The original statement by Dr. H. B. Dixon has, I think, been much misunderstood. He referred to explosion tests in absolutely dry air in comparison with those in moist air. Practically, there is always enough moisture in air to obtain the necessary chemical reactions of gases when ignition takes place.

I trust the foregoing explanation will help clarify the views of Mr. Walls and those of others who have referred to apparent inconsistencies in recommendations of the British authorities and of the Bureau of Mines.

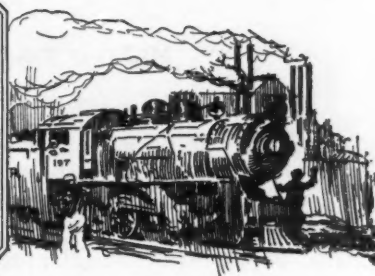
Mr. Rice seems to suggest that we have been ill advised in reprinting for public consumption a truth that Mr. Rice assures us is too often quoted in error. We have rarely heard it quoted at all either erratically or in any other way. We are in fact not concerned about our part in its dissemination even if it is misquoted. First, because it is the truth, and secondly because if it is misapplied it serves to mitigate the evil of another truth far more often misquoted and misunderstood namely that water is helpful in reducing the violence of explosions.

We have often heard it said that if the air contains water vapor to the saturation point it will prevent an explosion. We have seen that statement in the proceedings of our national mining society. Seeing that, it seems well to point out that methane does not combine with oxygen direct but through aqueous vapor and the more water vapor the more rapid the reaction. The real value of humidified air is that it leaves the natural water of the mine dusts undiminished and in condensing adds to that moisture. As the quantity has to be so great that the dust when compressed in the hand will drip water we feel that there is some real danger in declaring the efficacy of humidification, for when incompletely performed it is not efficacious even though helpful. So perhaps, Mr. Rice, it is well to write the whole truth in *Coal Age*, the manner in which water vapor aids an explosion, the value of humidification and the risk accompanying imperfect applications of water. This we have done; we hope helpfully.

EDITOR.



Production And the Market



Increasing Inquiries Intensify Confidence in Soft-Coal Market; Prices Recede Slightly

Despite a slight recession in prices and the customary pre-holiday tendency to hold off during the past week, a distinct note of optimism continues to pervade the bituminous-coal market. Favorable crop reports, bespeaking prosperity for the farmer, have been followed by indications that other industries have turned the corner with the appearance of buying for the replenishment of depleted stocks, which would seem to show that the long-awaited autumn upturn is under way. Improvement is especially marked in the iron and steel trade, where a notable feature of the recent brisk demand is the heavy buying of railroads, which in the last two weeks have been in the market for about 400,000 tons of steel. Even the textile industry, which has been particularly hard hit by the prolonged depression, is showing encouraging signs of a revival in activity, the change for the better in that field being scarcely less notable than that in the iron and steel trade.

Volume of Inquiries Growing

The general improvement in business is reflected in a steadily increasing volume of inquiries in the soft-coal market, and while actual orders have not soared to any great heights, the evidence of interest on the part of consumers has served to restore a much-needed note of confidence.

Coal Age Index of spot prices of bituminous coal receded slightly during the past week, standing on Aug. 30 at 164, the corresponding price being \$1.99, compared with 165 and \$2 for the previous week.

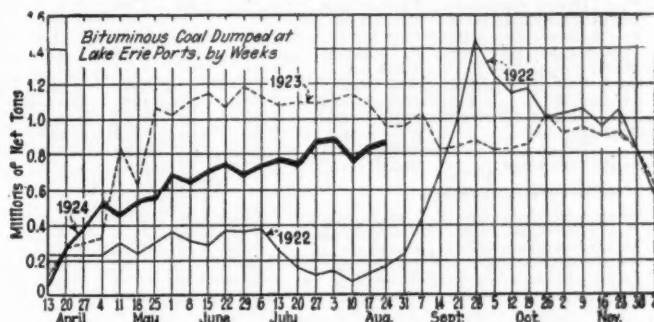
A pronounced increase in activity took place at Hampton Roads, dumpings of coal for all accounts during the week ended Aug. 28 totaling 364,227 net tons, compared with 315,540 tons during the preceding week.

The movement of coal up the lakes is still far behind that of last year, but with the carryover from a year

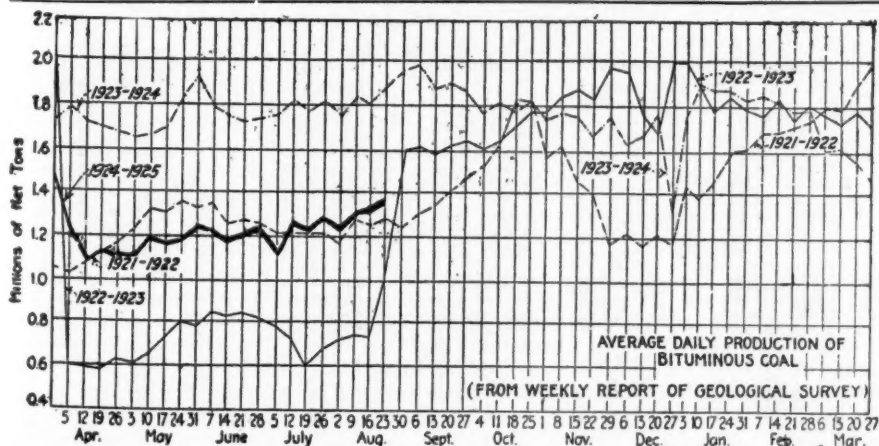
ago and lower consumption probably will prove ample for all requirements.

Production of bituminous coal registered a striking gain during the third week in August, crossing the 8,000,000-ton mark for the first time since last March. The total output during the week ended Aug. 23, according to the Geological Survey, was 8,293,000 net tons, an increase of 384,000 tons over the previous week, when 7,909,000 tons was produced, according to revised figures. Anthracite production also reacted upward, 1,711,000 net tons having been produced during the week ended Aug. 23, an increase of 325,000 tons over the preceding week, when the output was 1,386,000 net tons.

A better tone pervades the anthracite market, retailers ordering more freely last week in a last-minute



move to take advantage of summer prices. The larger companies advanced mine prices of the larger sizes on Sept. 1, the increase averaging 10c. per ton. Independent quotations, however, are practically unchanged but firm. Stove coal continues to show the greatest strength in demand, though egg and pea show improvement. Steam sizes likewise are moving somewhat better and prices show a firmer tendency.



Estimates of Production

(Net Tons)

BITUMINOUS

	1923	1924
Aug. 9.....	9,851,000	7,789,000
Aug. 16 (a).....	10,843,000	7,909,000
Aug. 23 (b).....	11,383,000	8,293,000
Daily average.....	1,897,000	1,382,000
Cal. yr. to date (c).....	354,612,000	285,875,000
Daily av. to date.....	1,780,000	1,430,000

ANTHRACITE

	1923	1924
Aug. 9.....	1,735,000	1,664,000
Aug. 16.....	1,858,000	1,386,000
Aug. 23.....	2,165,000	1,711,000
Cal. yr. to date.....	66,592,000	58,950,000

COKE

	1923	1924
Aug. 16 (a).....	334,000	95,000
Aug. 23 (b).....	327,000	109,000
Cal. yr. to date (c).....	12,800,000	6,872,000

(a) Revised since last report. (b) Subject to revision. (c) Minus one day's production to equalize number of days in the two years.

Midwest Trade Grows

The Midwest coal trade feels distinctly better. There is nothing in the nature of a rush going on but domestic coals are shaking off their sluggishness and slight advances in some coals were attempted for Sept. 1. Franklin County 6-in. lump advanced from \$3 to \$3.25, egg from \$2.75 to \$3 and nut from \$2.35 to \$2.50. Screenings move in small quantities and remain at about the same price range they have occupied for weeks—\$1.60@1.75. No other price changes in Western coals were anticipated for Sept. 1. West Kentucky block held at \$2.40@2.60; 6x3-in. egg and 3-in. lump, \$2.25@2.40; No. 2 nut, \$1.75@1.90, and screenings, \$1.25@1.35. Indiana coals also were unchanged. No. 4 lump moves at \$3 and the other sizes trail Franklin County by 15 or 25c. No. 5 sizes maintain about their usual 25c. differential under No. 4.

In Chicago the retail trade in anthracite is picking up a little in anthracite as well as in high-grade bituminous. Hard-coal prices made their monthly wholesale advance of about 10c. which had its reflection in retail quotations. West Virginia smokeless continued its slow and steady movement into the Chicago district, with mine run maintaining its \$2 top price. So much of this coal has been

coming in all summer, however, that the domestic trade is not crying for it now.

In the Cartersville field of Williamson and Franklin counties there is a noticeable movement of lump in the last week for domestic business, principally in the Northwest. Egg is just beginning to move a little, but nut and the other sizes are heavy and steam is going to be a problem in a short time when the mines show steadier work. Mines still get from 1 to 3 days a week in places and the miners are about at the limit of their resources.

Railroad tonnage is light. Strip mines show increased tonnages. All mines have "no bills" of all kinds, excepting lump, on track. The off-grade coals around Marion are having a hard time and are being marketed through a group of scalpers in Chicago.

In the East Jackson and Duquoin field conditions are bad with no immediate prospect of improvement. In the Mt. Olive district the railroad tonnage is about the only thing that keeps the mines in operation. Mines are getting 2 days a week, at most. In the Standard district conditions are unusually bad. Coal is still selling below cost and all sizes remain on track unbilled.

There is now a little activity in St. Louis in Southern Illinois high-grade coals. Other than that the movement is

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern		Market Quoted	Sept. 1 1923	Aug. 18 1924	Aug. 25 1924	Aug. 30 1924†
Smokeless lump.....	Columbus....	\$5.95	\$3.60	\$3.60	\$3.50@3.75	
Smokeless mine run.....	Columbus....	3.00	2.00	2.00	1.85@2.15	
Smokeless screenings.....	Columbus....	2.35	1.20	1.25	1.15@1.30	
Smokeless lump.....	Chicago....	6.35	3.85	3.60	3.50@3.75	
Smokeless mine run.....	Chicago....	3.35	1.85	1.85	1.75@2.00	
Smokeless lump.....	Cincinnati....	6.25	3.85	3.75	3.50@4.00	
Smokeless mine run.....	Cincinnati....	3.25	1.85	1.85	1.75@2.00	
Smokeless screenings.....	Cincinnati....	2.50	1.35	1.30	1.25@1.50	
*Smokeless mine run.....	Boston....	5.10	4.15	4.15	4.10@4.20	
Clearfield mine run.....	Boston....	2.20	1.85	1.85	1.45@2.35	
Cambria mine run.....	Boston....	2.85	2.45	2.45	2.00@2.60	
Somerset mine run.....	Boston....	2.50	2.10	2.10	1.75@2.40	
Pool 1 (Navy Standard).....	New York....	3.25	2.30	2.85	2.50@2.90	
Pool 1 (Navy Standard).....	Philadelphia....	3.10	2.80	2.40	2.35@2.50	
Pool 1 (Navy Standard).....	Baltimore....				2.40@2.90	
Pool 9 (Super. Low Vol.).....	New York....	2.55	2.05	2.10	2.00@2.30	
Pool 9 (Super. Low Vol.).....	Philadelphia....	2.55	2.15	2.15	1.95@2.35	
Pool 9 (Super. Low Vol.).....	Baltimore....	2.45	1.95	1.95	1.80@1.90	
Pool 10 (H.Gr. Low Vol.).....	New York....	2.25	1.85	1.85	1.90@2.00	
Pool 10 (H.Gr. Low Vol.).....	Philadelphia....	2.15	1.75	1.75	1.65@1.90	
Pool 10 (H.Gr. Low Vol.).....	Baltimore....	2.25	1.70	1.70	1.50@1.65	
Pool 11 (Low Vol.).....	New York....	2.00	1.60	1.60	1.50@1.80	
Pool 11 (Low Vol.).....	Philadelphia....	1.85	1.45	1.45	1.35@1.60	
Pool 11 (Low Vol.).....	Baltimore....	1.90	1.55	1.55	1.40@1.50	
High-Volatile, Eastern						
Pool 54-64 (Gas and St.).....	New York....	1.70	1.50	1.50	1.35@1.65	
Pool 54-64 (Gas and St.).....	Philadelphia....	1.85	1.50	1.50	1.40@1.60	
Pool 54-64 (Gas and St.).....	Baltimore....	1.85	1.45	1.45	1.35@1.40	
Pittsburgh so'd gas.....	Pittsburgh....	3.00	2.40	2.40	2.30@2.50	
Pittsburgh gas mine run.....	Pittsburgh....	2.50	2.10	2.10	2.00@2.25	
Pittsburgh mine run (St.).....	Pittsburgh....	2.30	1.85	1.85	1.75@2.00	
Pittsburgh slack (Gas).....	Pittsburgh....	1.55	1.30	1.30	1.25@1.35	
Kanawha lump.....	Columbus....	3.05	2.10	2.10	2.00@2.25	
Kanawha mine run.....	Columbus....	1.90	1.40	1.40	1.30@1.55	
Kanawha screenings.....	Columbus....	1.15	1.05	1.05	1.00@1.15	
W. Va. lump.....	Cincinnati....	3.60	2.25	2.05	1.85@2.25	
W. Va. gas mine run.....	Cincinnati....	1.80	1.55	1.50	1.25@1.50	
W. Va. steam mine run.....	Cincinnati....	1.80	1.40	1.50	1.25@1.50	
W. Va. screenings.....	Cincinnati....	1.35	.90	1.00	.80@1.00	
Hocking lump.....	Columbus....	2.75	2.45	2.40	2.25@2.55	
Hocking mine run.....	Columbus....	1.85	1.55	1.55	1.45@1.65	
Hocking screenings.....	Columbus....	1.10	1.05	1.05	1.00@1.10	
Pitta. No. 8 lump.....	Cleveland....	2.65	2.40	2.40	2.00@2.85	
Pitta. No. 8 mine run.....	Cleveland....	2.10	1.65	1.80	1.75@1.85	
Pitta. No. 8 screenings.....	Cleveland....	1.35	1.30	1.20	1.05@1.20	
Midwest		Market Quoted	Sept. 1 1923	Aug. 18 1924	Aug. 25 1924	Aug. 30 1924†
Franklin, Ill. lump.....	Chicago....	\$4.20	\$2.85	\$2.85	\$3.00@3.25	
Franklin, Ill. mine run.....	Chicago....	3.00	2.35	2.35	2.25@2.50	
Franklin, Ill. screenings.....	Chicago....	1.80	1.85	1.85	1.60@1.15	
Central, Ill. lump.....	Chicago....	3.10	2.60	2.60	2.50@2.75	
Central, Ill. mine run.....	Chicago....	2.20	2.10	2.20	2.15@2.25	
Central, Ill. screenings.....	Chicago....	1.40	1.60	1.55	1.35@1.75	
Ind. 4th Vein lump.....	Chicago....	3.35	2.75	2.85	2.75@3.00	
Ind. 4th Vein mine run.....	Chicago....	2.60	2.35	2.35	2.25@2.50	
Ind. 4th Vein screenings.....	Chicago....	1.60	1.80	1.80	1.60@1.70	
Ind. 5th Vein lump.....	Chicago....	2.75	2.50	2.50	2.40@2.65	
Ind. 5th Vein mine run.....	Chicago....	2.10	2.10	2.10	2.00@2.25	
Ind. 5th Vein screenings.....	Chicago....	1.40	1.50	1.50	1.40@1.65	
Mt. Olive lump.....	St. Louis....	3.10	2.85	2.85	2.75@3.00	
Mt. Olive mine run.....	St. Louis....	2.05	2.50	2.50	2.50	
Mt. Olive screenings.....	St. Louis....	1.35	2.00	2.00	1.75	
Standard lump.....	St. Louis....	2.60	2.15	2.15	2.00@2.35	
Standard mine run.....	St. Louis....	2.05	1.80	1.80	1.75@1.85	
Standard screenings.....	St. Louis....	1.00	1.20	1.20	1.15@1.25	
West Ky. lump.....	Louisville....	2.55	2.20	2.25	2.15@2.35	
West Ky. mine run.....	Louisville....	1.90	1.60	1.60	1.40@1.85	
West Ky. screenings.....	Louisville....	.90	1.20	1.30	1.25@1.35	
West Ky. lump.....	Chicago....	2.75	2.30	2.30	2.25@2.40	
West Ky. mine run.....	Chicago....	1.75	1.55	1.60	1.35@1.90	
South and Southwest						
Big Seam lump.....	Birmingham..	3.75	3.40	3.40	\$3.00@3.30	
Big Seam mine run.....	Birmingham..	1.95	1.75	1.75	1.50@2.00	
Big Seam (washed).....	Birmingham..	2.35	2.00	2.00	1.75@2.25	
S. E. Ky. lump.....	Chicago....	3.10	2.50	2.60	2.15@2.50	
S. E. Ky. mine run.....	Chicago....	1.80	1.60	1.75	1.50@1.75	
S. E. Ky. lump.....	Louisville....	3.10	2.10	2.10	2.00@2.50	
S. E. Ky. mine run.....	Louisville....	2.30	1.50	1.50	1.25@1.75	
S. E. Ky. screenings.....	Louisville....	1.20	.95	.95	.85@1.10	
S. E. Ky. lump.....	Cincinnati....	3.75	2.35	2.50	2.25@2.75	
S. E. Ky. mine run.....	Cincinnati....	1.80	1.55	1.50	1.25@1.65	
S. E. Ky. screenings.....	Cincinnati....	1.45	1.00	1.00	.80@1.10	
Kansas lump.....	Kansas City..	4.50	4.50	4.50	4.50	
Kansas mine run.....	Kansas City..	3.50	3.50	3.50	3.50	
Kansas screenings.....	Kansas City..	2.60	2.50	2.50	2.50	

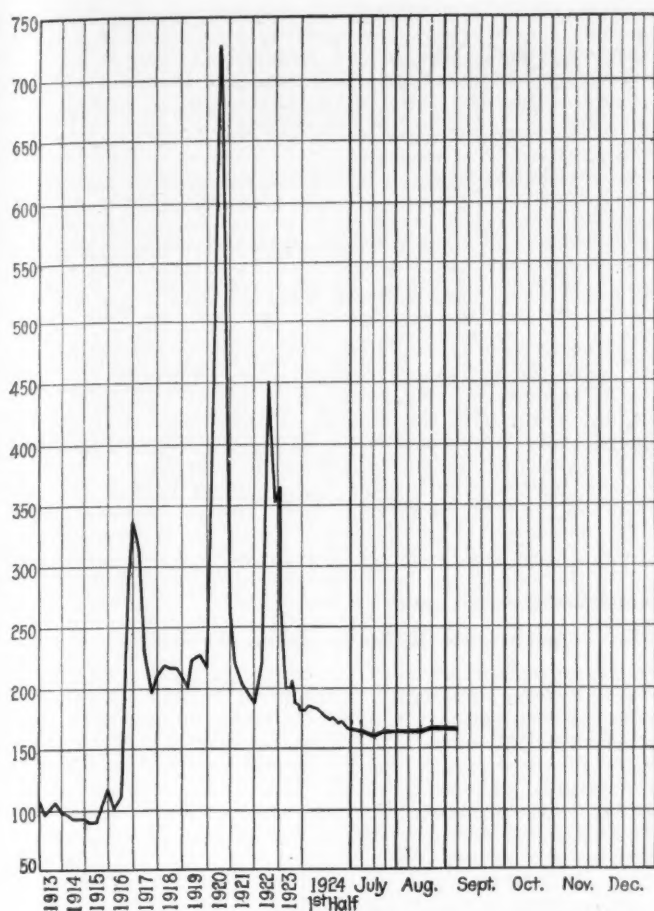
* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in heavy type, declines in italics.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

		Market Quoted	Freight Rates	Sept. 1, 1923		Aug. 25, 1924		Aug. 30, 1924†	
				Independent	Company	Independent	Company	Independent	Company
Broken.....	New York....	\$2.34			\$7.75@8.35		\$8.00@9.05		\$8.00@9.25
Broken.....	Philadelphia....	2.39			7.90@8.10		8.90@9.05		8.90@9.05
Egg.....	New York....	2.34		\$8.50@14.00	8.00@8.35	\$8.50@9.00	8.65@9.05	\$8.50@9.00	8.75@9.25
Egg.....	Philadelphia....	2.39		9.25@11.00	8.10@8.35	9.00@9.70	9.00@9.05	9.00@9.70	9.00@9.05
Egg.....	Chicago....	5.06		8.50@12.00	7.25@7.45	8.09@8.20	8.03@8.10	8.17@8.27	8.14@8.20
Stove.....	New York....	2.34		8.50@14.50	8.00@8.35	9.00@9.50	8.65@9.30	9.00@9.50	8.75@9.50
Stove.....	Philadelphia....	2.39		9.25@12.00	8.15@8.35	9.35@10.00	9.05@9.10	9.35@10.00	9.05@9.10
Stove.....	Chicago....	5.06		8.50@12.00	7.25@7.45	8.40@8.50	8.43@8.53	8.63@8.75	8.50@8.64
Chestnut.....	New York....	2.34		8.50@14.00	8.00@8.35	8.50@9.00	8.65@9.15	8.50@9.00	8.75@9.25
Chestnut.....	Philadelphia....	2.39		9.25@11.00	8.15@8.35	8.85@9.80	9.00@9.05	8.85@9.80	9.00@9.05
Chestnut.....	Chicago....	5.06		8.50@12.00	7.25@7.45	8.18@8.33	8.28@8.34	8.26@8.40	8.44@8.60
Range.....	New York....	2.34			8.30		8.90		8.90
Pea.....	New York....	2.22		7.50@9.00	6.00@6.30	4.25@5.25	5.50@6.00	4.25@5.25	5.50@6.00
Pea.....	Philadelphia....	2.14		7.00@7.50	6.15@6.20	5.75@6.25	5.75@6.00	5.75@6.25	5.75@6.00
Pea.....	Chicago....	4.79		7.00@8.50	5.30@5.65	5.23@5.55	5.36@5.91	5.17@5.45	5.36@6.20
Buckwheat No. 1.....	New York....	2.22		3.50	3.50@4.15	2.00@2.25	3.00@3.15	2.25@2.65	3.00@3.15
Buckwheat No. 1.....	Philadelphia....	2.14		3.50	3.50	2.50@3.00	3.00	2.50@3.00	3.00
Rice.....	New York....	2.22		2.50	2.50	1.75@2.00	2.00@2.25	1.75@2.00	2.00@2.25
Rice.....	Philadelphia....	2.14		2.50	2.50	2.00@2.25	2.25	2.00@2.25	2.25
Barley.....	New York....	2.22		1.50	1.50	1.15@1.40	1.50	1.15@1.50	1.50
Barley.....	Philadelphia....	2.14		1.50	1.50	1.50	1.50	1.50	1.50
Birdseye.....	New York....	2.22			1.60		1.60		1.60

* Net tons, f.o.b. mines. † Advances over previous week shown in heavy type, declines in italics.



Index	1924			1921
	Aug. 30	Aug. 25	Aug. 18	Sept. 1
Weighted average price	\$1.99	\$2.00	\$2.00	\$2.47

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States, weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913-1918," published by the Geological Survey and the War Industries Board.

light, although there are indications here and there of increased buying which will mature early this month. Anthracite, smokeless and coke are slow.

Kentucky Prices Advance

It is reported that the operators down in the Harlan, Straight Creek and Jellico producing districts have booked a considerable number of orders of late, principally on movement to the South and Southeast, resulting in their having enough business in hand to be able to refuse orders unless prices are satisfactory, with the result that they are now pricing block coal for late September delivery at from \$2.75@ \$3 a ton, but still taking some immediate business at around \$2.50. Lump coal also has advanced a little in that section and is being priced as high as \$2.50, with egg as high as \$2.25.

There has been considerable improvement in general demand in the Southeastern field. However, it is claimed that the Southern demand will be filled soon and that prices probably will not go much over a peak of \$2.75 for the time being.

Northwest Anthracite More Active

Coal is generally dull at Duluth this week in bituminous, but anthracite has taken a decided spurt and out of town orders especially are good from the Dakotas and from Winnipeg. In fact the situation in Winnipeg seems to be bordering on the serious. Dealers there are worrying a little about prospective difficulties in getting enough coal.

Shipments to this port have been steadily dropping off for the past three weeks, and this week only 37 cargoes arrived, of which six were hard coal. Fourteen are reported on the way, of which six are hard. So far this year, since

the opening of navigation, 510 cargoes have been landed, of which 414 were soft coal. This is below average, but the stocks on docks at the beginning of the period make up for the lack of shipments.

Soft-coal prices are the same. Hard coal is weakening a little, and the 10c. advance scheduled for the first of the month will apply only to stove, egg and nut. Prices are as follows at present with pea and buckwheat off: Stove, \$13.50; egg, \$13.10; nut, \$13.35; pea, \$10.60; buckwheat, \$8.

At the Twin Cities there is a noticeable shortage of steam sizes, but buyers with a little coal on hand are holding off. This moves the trade to hope that when cold weather arrives and coal demand picks up, there may be real strength in the Minneapolis steam market. The retail trade around southern Minnesota is now putting in hard coal. The volume on the docks is expected to be smaller this year than normal but movement inland can be swift during the next few weeks, due to heavy traffic in empties on their way back from delivering grain eastward. The 10c. increase Sept. 1 put hard-coal prices on a winter basis. There are no changes in soft-coal prices in spite of the lack of demand for those grades.

West Improves Steadily

Continued though slight improvement in the Southwestern market is reported, and operators are expecting an early opening of the heavy autumn demand. Farm prosperity is expected to be reflected in increased orders for domestic grades. No changes have been made in prices in the Kansas City district.

A marked stimulation was noted last week both in the sales and production of domestic coal in Colorado. Orders are beginning to come in more steadily now and operators are anticipating a busy month for September. The average working time of the mines picked up to twenty-one hours last week. Prices were unchanged to Sept. 1 although a slight advance was expected then.

In Utah intermediate sizes are a drag on the market, in spite of recent price adjustments. The sales office of one big firm reports business generally a little slower than a year ago. The demand for coal from the coast is very light now that the storage orders have been filled, while the Northwest business has not started yet, it is stated. Mining, smelting, cement and sugar industries are buying some coal. The sugar factories will start operations the first week in October. Retail business is in good shape.

Better Domestic Market at Cincinnati

Betterment of the domestic market with wider breadth of inquiry is the only bright spot in the sluggish situation at Cincinnati. Selling agents for coals of quality profess to have experienced little difficulty in getting the advance placed on prepared sizes. Lake buyers are beginning to evince interest in the market and some attractive buying orders for run of mine and 2-in. sizes have been placed lately. Low grades are hard to move, being the only lines on which forced concessions are being made. Smokeless prices for September are practically the same as for August, standard Pocahontas being held at \$4 by companies with bookings for the month, others taking only contract business at \$3.75. Some New River spot can still be picked up at \$3.50. The market on screenings still drags.

The domestic trade continues to be the best feature of the Columbus market, but even that lacks real vim. Buying by dealers is better but not equal to previous years. Smokeless and splints are moving best, although there is a fair business in Hocking, Jackson and Pomeroy lump. Dullness characterizes the steam trade. Buying is limited to present needs and many of the larger consumers are still using reserves, which in some instances are still heavy. Bargain buying is the rule, although there is not as much demurrage coal on the market as formerly. Utilities, railroads, schools and public institutions are taking a fair tonnage.

The Cleveland market shows better tone, due to the usual seasonal pick-up and improved business conditions. Output in eastern Ohio during the week ended Aug. 23, 296,000 tons, was the largest of any week since that of March 22, the gain over the preceding week being 49,000 tons. Spot prices remain pretty much the same except that slack has receded further to \$1.05@ \$1.10 for slack and \$1.10@ \$1.20 for nut and slack. The railroads in report increases in general traffic handled during the past few weeks.

Further Gain at Pittsburgh

General line trade at Pittsburgh worked up a trifle farther in the past week. Little change has been observable from week to week, but there has been a decided gain in the aggregate in the past two months. There has been little increase in the volume of coal moving through the spot market, but there is a little more activity. Buying of domestic coal by retailers has been picking up, though it is not yet really active by ordinary comparisons. Prices are a little steadier.

The demand at Buffalo continues light, though some in the trade profess to see the fall trade coming into sight. The decision of the City School Board to use soft coal instead of hard for a great part of its fires will set many private users to asking for the same thing, as it means an expense of less than \$6 a ton in place of \$13 for anthracite. The coke trade is still inactive.

The Toronto market shows practically no change, as industrial requirements are still quite limited. A gradual improvement, however, is regarded as probable in view of favorable reports of the Western harvest, which will stimulate all lines of business. Quotations f.o.b. cars at destination are as follows: Steam lump, \$6@ \$6.40; Pennsylvania smokeless, \$5.30@ \$6.25; slack, about \$5.

Inquiry More Active in New England

High-grade New River and Pocahontas has reacted from a low of \$5.25 per gross ton on cars Boston to \$5.35. Receipts at Mystic Wharf have been much lighter the past week and inquiry has been a bit more active, in some instances involving shipments through the balance of the year, some at \$5.75 gross ton on cars Boston for strictly pool 1 mine-run coal.

Due to rather heavy arrivals prices declined early in the week at Providence and as low as \$5.30 on cars was taken for what was claimed to be pool 1 coal. The situation has firmed somewhat since, so that \$5.40 is now the general asking price.

Quotations to local shippers for spot coal at the southern loading ports indicate complete maintenance of last week's levels, \$4.10 gross ton f.o.b. Hampton Roads being the lowest at which strictly pool 1 mine-run coal is offered.

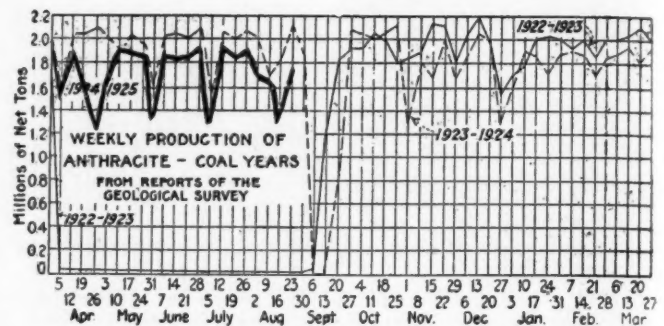
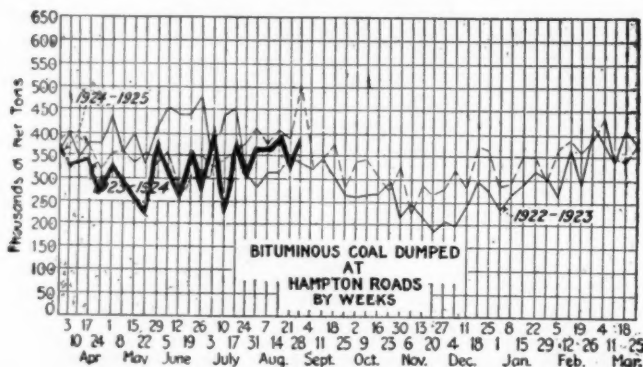
There is actually no all-rail market in New England now. Consequently prices are entirely nominal, although save for some tonnage from non-union mines on the B. & O. which is offered at lower prices—\$1.75 to \$2 for really good coal—prices seem to be just about as they have been for weeks.

Atlantic Markets Dull but Hopeful

Actual buying during the week at New York showed no real betterment, but there were more inquiries and taken as a whole the outlook is brighter. Favorable reports have been received as to business conditions in various parts of the East and sellers are optimistic that new orders will soon show themselves. The fact that the grain movement is expected to be in full swing soon has aroused some large consumers to the thought that they had better get busy and make arrangements for replenishing their reserve stocks, which are fast nearing depletion.

Orders have failed to flow readily as yet at Philadelphia, though more small orders are coming along. Railroads are taking a little extra tonnage, but the best customers are cement and brick plants.

The coal business at Baltimore is at the lowest ebb of many months as to prices. There is hardly a gas or steam



coal on the local market that is not selling at a mine-basis price below the actual cost of production. Not much coal is moving, however, at any price. The export situation has gone flat along with the balance of the trade. Only two shipments have been made on foreign account since Aug. 11.

Buying at Birmingham continues in restricted volume, but some increase in inquiry and business booked is reported and the trade is more hopeful. Orders are confirmed for the most part to small tonnages, but are larger in the aggregate with some contracts being made. Some improvement in the export and bunker movement is looked for, the demand being rather quiet at present.

Anthracite Reflects Better Feeling

A better feeling pervades the hard-coal market at New York. Dealers, apparently desirous of taking advantage of the August prices for domestic sizes, ordered a little more freely last week. The greatest strength is in the demand of stove coal, which has moved easily all summer, but chestnut improved greatly. Egg and pea coals also were in better demand. Average independent quotations were firmer and with the supply tighter, due to the better demand and continued low production, tended to still higher levels. Buckwheat No. 1 is in better demand and the better grades are a trifle stronger in price. Rice and barley are moving better.

The Philadelphia market has not lost ground, although some are apprehensive that the recent stir was only a flash. The larger companies still continue to work a short week, but better working time is general among the independents. Stove is the most wanted size, and dealers are able to get it without much trouble. It is taken for granted that all shippers will increase mine prices as of Sept. 1. Steam sizes have brightened up a bit, with the exception of rice, which is still weak.

A seasonal increase is developing at Baltimore. Consumers apparently have been taking advantage of the last chance for summer rates, but a large number are not laying in the usual full winter supply. Wholesalers' price advances will force up retail prices at least 25c. per ton during September.

Trade at Buffalo is doing a little better and in a week or two ought to be up to something like normal proportions. People have been slow to buy. They have heard so much of the effort to get coal at lower prices that it has been hard to interest them.

Connellsville coke operators have advanced the price 25c. on fourth-quarter furnace coke contracts, two contracts at least being closed at \$3.25. A few operators are holding off in hope of securing somewhat more than \$3.25. By the reduction of last June most of the operators are paying the Nov. 10, 1917, scale, about one-third below the Frick scale of Aug. 23, 1922, which the Steel Corporation continues to pay. The spot furnace-coke market has advanced 10c. to \$3.10. Heating or medium sulphur coke has stiffened sharply and is now quotable rather steady at \$2.90@ \$3. Foundry coke has been particularly dull in the past fortnight, but prices are unaltered, the market being quotable at \$4@ \$4.50.

Car Loadings, Surpluses and Shortages

	Cars Loaded	
	All Cars	Coal Cars
Week ended Aug. 16, 1924.....	952,888	144,549
Previous week.....	942,198	149,482
Week ended Aug. 18, 1923.....	1,039,930	189,179

	Surplus Cars		Car Shortage	
	All Cars	Coal Cars		
Aug. 15, 1924.....	278,476	127,801		
Previous week.....	296,496	138,325		
Aug. 14, 1923.....	78,404	6,293	8,315	4,193

Foreign Market And Export News

British Coal Market Steady but Slow; Output Advances Sharply

The Welsh coal market is steady and has maintained its recent improvement, though the general situation is far from satisfactory. Some of the best coals are fairly well booked for prompt loading. Most of the Welsh operators are losing money at the current prices, though experience varies from colliery to colliery; some of the more modern pits are showing a profit, but the older concerns are undoubtedly losing heavily. Despite the fact that few collieries are able to cover operating expenses, they are reluctant to make concessions.

The men everywhere are anxious to keep the pits going, offering in some instances to work on a piece-work basis to prevent shutdown. In one case a mine employing 1,700 men has been restarted on these terms. The August wages of the miners have remained at the minimum of 42.22 per cent above the 1915 standard, of which the owners have to make up 18.17 per cent.

The Newcastle market has remained fairly steady since its improvement a week ago, and best steams and best gas coals have been able to find quite a ready market, though business in the other sections is slow. There are various contracts to be filled, of around 10,000-12,000 tons of gas coals for various European plants.

Production recovered sharply following the bank holidays, a cable to *Coal Age* states, output of the British collieries during the week ended Aug. 16 totaling 5,193,000 tons, according to the official reports. This compares with 3,446,000 tons during the week ended Aug. 9 and 5,010,000 tons during that ended Aug. 2.

The output during the second quarter of 1924 was 5,367,800 tons less than during the first quarter and 2,901,900 below the second quarter of 1923. There were 4,600 more wage earners during the second quarter than in the preceding one and 33,800 more than a year ago. The number of working days

was 8½ per cent below the first quarter and 6 per cent below the corresponding quarter last year. Exports during the second quarter were 280,843 tons less than during the first three months and 5,689,372 tons under those during the second quarter of 1923. Price reductions have been made since March of 4s. on foreign shipments and locomotive coal, and 3s. on household grades.

Hampton Roads Market Dull And Unpromising

Business at Hampton Roads is featureless, little activity being in evidence. Prices have fallen to a low ebb, threatening to break the low record since the war. Coastwise trade is dull, foreign trade almost invisible, and bunker business only fair.

Some increase in domestic trade is apparent, retailers placing orders for September shipment, somewhat strengthening the domestic price of smokeless coal. This business, however, has made no impression on the port trade. The supplies at tidewater are fair, shippers making every effort to keep things moving to avoid demurrage. The tone of the market is weak and little hope of early improvement is felt.

French Household Coal Steady; Industrial Inquiry Slow

The French coal market continues without important change. House coals remain steady, dry and half-bituminous fuels being in good request and disposals insufficient to meet the demand. For industrial coals, although the collieries are assured of a certain regularity in marketing by contracts, the inquiry is somewhat slower, due to the pessimism following recent political developments. The placing of dry smalls is rather difficult.

On the German side, liberal offers continue, outside of indemnity deliv-

eries, and this may be the prelude to further competition.

The freight rate is 20 fr. Bethune-Paris and Bethune-Reims.

Indemnity deliveries to France and Luxemburg for the first thirteen days of the month were 179,800 tons of coal, 173,200 tons of coke and 8,000 tons of lignite briquets, or 361,000 tons in all.

Supplies of coke to the O. R. C. A. for the first eighteen days of August were 165,207 tons, or a daily average of about 9,235 tons.

There is an accumulation of stocks at the Belgian mines and everywhere the situation is critical, especially in the district of Borinage, where the collieries meet keen competition in bituminous coals from British, French and even German mines.

Germany delivered 2,000,000 tons of coal to Italy on reparation account during the first six months of this year, according to official statistics at Rome.

Export Clearances, Week Ended Aug. 30, 1924

FROM PHILADELPHIA

For Cuba: Tons
Br. Str. Sunpath, for Havana.....
For Newfoundland:
Nor. Str. Recto, for St. John's.....

FROM BALTIMORE

For Porto Rico:
Am. Str. Delfina, for San Juan 3,438

FROM HAMPTON ROADS

For Newfoundland: Tons
Nor. Str. Osterdal, for Lewisporte... 5,619
For Spain:
Br. Str. Lancastrian, for Barcelona.. 3,300
For Newfoundland:
Amer. Schr. Katherine May, for St. Johns 1,267
For Brazil:
Br. Str. Cheniston, for Rio de Janeiro. 6,475

Hampton Roads Pier Situation

N. & W. Piers, Lamberts Pt.:	Aug. 21	Aug. 28
Cars on hand.....	1,051	1,082
Tons on hand.....	65,827	67,931
Tons dumped for week.....	157,234	124,903
Tonnage waiting.....	10,700	10,000

Virginian Piers, Sewalls Pt.:	Aug. 21	Aug. 28
Cars on hand.....	1,797	1,372
Tons on hand.....	127,000	100,100
Tons dumped for week.....	53,826	110,879
Tonnage waiting.....	10,163	7,300

C. & O. Piers, Newport News:	Aug. 21	Aug. 28
Cars on hand.....	1,458	1,521
Tons on hand.....	79,010	80,875
Tons dumped for week.....	70,670	89,221
Tonnage waiting.....	3,285	225

Pier and Bunker Prices, Gross Tons

PIERS

	Aug. 23	Aug. 30†
Pool 9, New York.....	\$4.50@ \$4.85	\$4.50@ \$4.85
Pool 10, New York.....	4.35@ 4.65	4.35@ 4.65
Pool 11, New York.....	4.00@ 4.35	4.00@ 4.35
Pool 9, Philadelphia....	4.90@ 5.25	4.90@ 5.25
Pool 10, Philadelphia....	4.45@ 4.70	4.45@ 4.70
Pool 11, Philadelphia....	4.30@ 4.50	4.30@ 4.50
Pool 1, Hamp. Roads....	4.10@ 4.20	4.05
Pool 2, Hamp. Roads....	4.00@ 4.10	3.95
Pools 5-6-7 Hamp. Rds.	3.90@ 4.00	3.85@ 4.00

BUNKERS

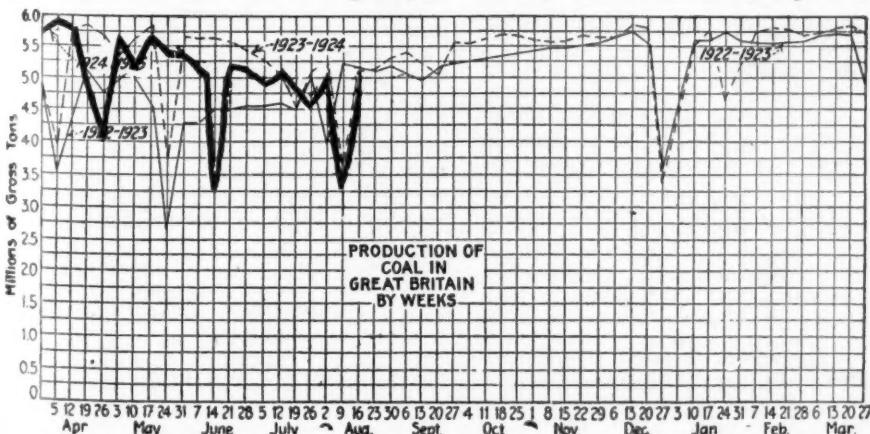
Pool 9, New York.....	4.75@ 5.10	4.75@ 5.10
Pool 10, New York.....	4.60@ 4.90	4.60@ 4.90
Pool 11, New York.....	4.25@ 4.60	4.25@ 4.60
Pool 9, Philadelphia....	4.90@ 5.25	4.90@ 5.25
Pool 10, Philadelphia....	4.75@ 4.95	4.75@ 4.95
Pool 11, Philadelphia....	4.50@ 4.70	4.50@ 4.70
Pool 1, Hamp. Roads....	4.10@ 4.20	4.15
Pool 2, Hamp. Roads....	4.00@ 4.10	4.05
Pools 5-6-7 Hamp. Rds.	3.90@ 4.00	3.85@ 4.00

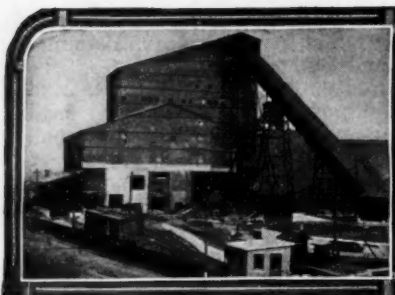
Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations by Cable to Coal Age

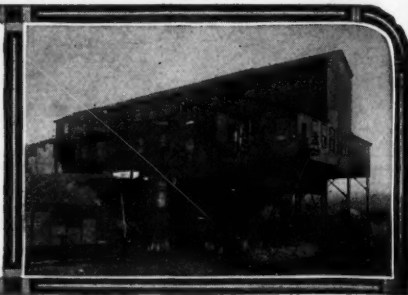
Cardiff:	Aug. 23	Aug. 30†
Admiralty, large.....	29s.	29s. 6d. @ 29s.
Steam smalls.....	17s. @ 17s. 6d.	17s.
Newcastle:		
Best steams.....	20s. 9d. @ 21s.	20s. 9d. @ 24s.
Best gas.....	22s. @ 22s. 6d.	22s. 6d. @ 23s.
Best bunkers.....	19s. 6d.	20s.

†Advances over previous week shown in heavy type, declines in italics.





News Items From Field and Trade



ALABAMA

A large tract of land lying between the furnace and coking plants of the Woodward Iron Co. and the pipe plant, at Bessemer, has been acquired by the Woodward company. It is understood that the property was purchased as a protection against encroachment, the rumor of the contemplated erection of a steel plant being denied by the officials.

Alabama produced a total of 4,689,641 net tons of coke during the calendar year 1923, according to the official report of State Mine Inspector C. H. Nesbitt, of which 4,448,128 tons, or 94.8 per cent, was made in byproduct ovens, and 241,513 tons, or only 5.2 per cent, was produced in the old beehive ovens. Byproduct ovens in operation during 1923 numbered 1,196.

The Alabama By-Products Corporation will begin immediately the construction of twenty-five additional ovens at its Boyles plant, according to official announcement. The corporation now has seventy-five Koppers ovens in operation and the necessary plant equipment to take care of the coke byproducts, and the additional ovens will provide for coking something like 40,500 tons per month, the plant addition to cost around \$1,000,000. While most of the coal coked at the plant at present comes from the Majestic and Imperial mines of the Bush interests in upper Jefferson County, some coal is coked for outside parties. Byproduct gas is furnished to a number of industrial plants in the district. The new unit probably will be of the Koppers type, it is stated.

COLORADO

A total of 616,186 tons of coal was mined in Colorado during July, bringing the production for the state this year to 5,581,066 tons, according to James Dalrymple, state coal mine inspector. The average number of men employed in and about the mines since the first of the year is 12,317 and the average number of days worked in each mine, 99.2. Las Animas County led in the production of coal for July, Mr. Dalrymple said. In this county 272,510 tons were mined last month, making the total there for the year 1,902,739 tons of coal.

The state law governing the operation of coal mines was not complied with in the Alamo mine of the Alamo Coal Co., near Walsenburg, according to a report submitted to Governor Sweet by James Dalrymple, state coal mine inspector. The report was submitted in connection with an investi-

gation of the explosion on Aug. 5, in which Alex McBirnie, fireboss of the mine, lost his life and four other miners had a narrow escape from death or serious injury. In both sides of the mine many unlawful and dangerous shots were found," Dalrymple's report states. "Some of these shots were dependent upon others. The explosion appears to have been caused by the spitting of the fuse of one shot, which ignited the gas in the mine. It is evident the deceased did not examine the mine for gas before tamping, as required by law. The first south entry of the mine was advanced 156 ft. ahead of the air current, or 96 ft. farther than the law allows, all of which indicates that supervision in the mine was lax."

ILLINOIS

The Wenona Coal Co., Wenona, has been closed and the mining property will be dismantled.

The Black Star Coal Co., whose mine at Logan has been idle since last April, resumed mining Sept. 1, employing about 500 men.

The Ellisville Coal Mining Co., Ellisville, with main offices in Galesburg, has resumed operations at its principal mine, with two hundred men employed. The Cripple Creek mine of this company is operating about half time.

The Bohemian Coal Co., 332 South Michigan Avenue, Chicago, has been incorporated with capital of \$40,000 to deal in and mine coal. The incorporators are M. J. Cherry, Edward F. Morgan and Robert J. Byrne.

Mine No. 9, of the Consolidated Coal Co., Murphysboro, which was one of the largest in the state twenty years ago, will soon be a memory, as orders have been given to dismantle the property. The mine was originally planned to employ 600 men. Until recently about 200 have been at work. The Big Muddy River broke into the mine in 1921, flooding it, but was later pumped out. Trouble with water and quicksand is believed to be the cause for the decision to cease operations in the mine.

INDIANA

The Sunlight Coal Co., Indianapolis, has increased its capital stock from \$150,000 to \$750,000.

The Tunnelton Freeport Coal Co., at Blaster, will begin operation soon, it was announced by an official of the company last week. The mine is in

pool 11, and the holdings contain nearly half a million tons of that variety. It is equipped with the very latest methods of mining and shipping. The main office is in Tunnelton.

IOWA

A vein of coal twenty-three inches thick has been reached in the new Thomas mine near Guthrie Center, at a depth of 94 ft. The mine was started in April and will be producing this fall.

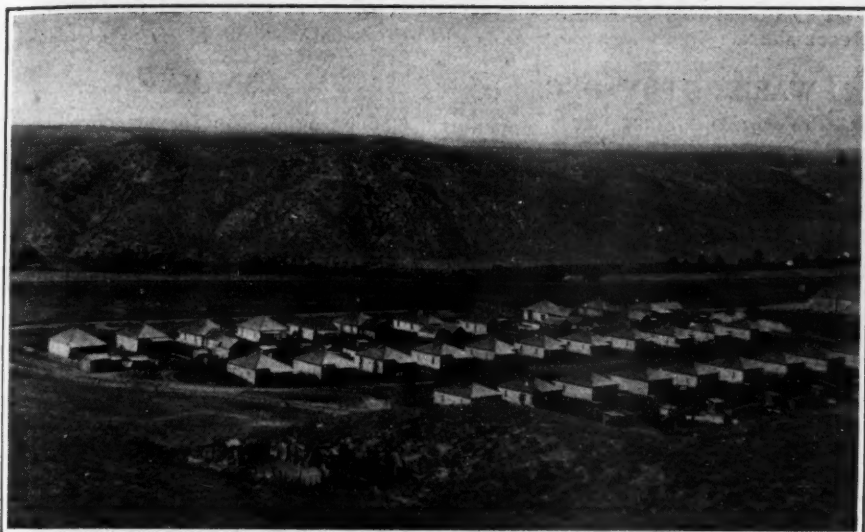
Larger mines of the state have prepared exhibits for the State Fair at Des Moines. L. E. Stamm, secretary of the state mine inspector's department, is in charge. Mr. Stamm reports that in 1923 6,000,000 tons of coal was mined in Iowa. In 1917 the total was 9,000,000 tons.

KENTUCKY

Southland Coal Mine No. 1, Henderson, opened Aug. 20 after being closed since April 15. Only thirty men could be used, because the mine will work only one section for the present. Officials say that all the men needed are available at the wages offered. All mines in Henderson County—fifteen—are operating at present, half of them on short time, two or three days a week.

Governor William J. Fields recently appointed assistant mine inspectors for the eight districts of the state as follows: James M. Boettger, DeKoven, First District; John Cates, Second District; John F. Brown, Ashland, Third District; James Dixon, Pineville, Fourth District; H. F. Reed, Central City, Fifth District; Burgess Thompson, Jenkins, Sixth District; G. W. Rose, Prestonburg, Seventh District, and D. W. Logan, Pineville, Eighth District.

Fire of undetermined origin destroyed \$30,000 worth of property of the Empire Coal Co. at Empire, Christian County, Aug. 17. The blaze had gained such headway when discovered that in spite of the hard work of the miners and citizens generally none of the buildings could be saved and practically all the contents were destroyed, the most valuable being the electrical apparatus, which was a complete wreck. The power house, boiler room, tippie and blacksmith shop, all frame structures, were burned, and sparks set fire to the headframe. Work has been temporarily suspended but in a limited way can be resumed in about a week. The fire will throw sixty-five men out of work for the time being. In normal periods the company employs 125 men.



Courtesy U. S. Distributing Corp.

Houses for Miners in the Village of Dietz

If this is a "camp" the word has become synonymous in Wyoming with comfort. Well fenced, green with verdure, and provided with large porches, conditions are favorable, though nature contributes little but bright skies and fair—too fair—weather.

MISSOURI

Fire of undetermined origin destroyed the buildings of the W. H. Fewell coal mine, near Sedalia, on the night of Aug. 16. The property loss was \$12,000.

The purchase of \$111,500 worth of coal land in Henry County by the West Missouri Power Co., of Pleasant Hill, has been approved by the State Public Service Commission. The commission likewise approved the purchase by the Pleasant Hill company of the assets of the Fort Scott & Nevada Light, Heat, Water & Power Co., for \$645,000 for the purpose of consolidation, and authorized issues of \$220,500 in 7 per cent cumulative preferred stock and \$870,000 in 20-year 6½ per cent first mortgage bonds. The company purposes supplying fuel to its various power plants from the Henry County coal deposit.

NEW YORK

The city school board of Buffalo has awarded the contract for furnishing 26,000 tons of smokeless coal for school purposes to the Weaver Coal Co., of Buffalo, on its bid of \$5.74 for mine run, delivered. The coal comes from Cambria Co., Pennsylvania, and is said to be similar to Pocahontas. The coal will be handled through the city trestles of Spaulding & Spaulding. It replaces anthracite.

OHIO

The Dillon No. 6 mine of the Wheeling & Lake Erie Coal Co., Lafferty, has resumed operations, giving employment to 250 men. The resumption follows a change from slope to shaft mining.

Common Pleas Judge Sowers has named Alfred A. Taylor receiver for the Ohio Service Coal Co., a Columbus corporation, upon petition of William H. Young, one of the three trustees named by the court to settle the affairs of the company. The dissolution of the

company has been authorized by the stockholders. Mr. Young says that he has paid debts of the company in excess of \$20,000.

The Black Diamond Mines, located near Amesville, are being cleaned up preparatory to placing them in operation after an idleness of several months. In all about 100 men will be given employment.

H. H. Heiner, formerly president of the Maynard Coal Co., of Columbus, and a well-known producer, recently was operated on for appendicitis at a Columbus hospital. He is now on a fair road to recovery.

PENNSYLVANIA

It is reported on good authority that the H. C. Frick Coke Co. expects to start operations soon at two of its idle mines in the New Salem district between Uniontown and Brownsville.

Operations of the Pennsylvania Coal & Coke Co. in July resulted in a deficit of \$47,000. This compares with a surplus of \$51,000 in July, 1923. In the first seven months of 1924 the loss was \$188,000 against a surplus of \$634,000 in the first seven months of 1923.

Residents of Aristes have formed a forest-fire company to be known as Anthracite Forest Fire Co. No. 2, of Aristes, which is the second of its kind in the country, Mt. Carmel having the first. The new company has received permission from the Lehigh Valley Coal Co. to occupy its ground and will create a community playground.

Details have just been completed at Pittsburgh for the purchase of approximately 2,200 acres of coal land in Wayne township, Greene County. The deal involves \$605,000 and makes the transaction the largest coal-land sale of the year in Pennsylvania. The deal was made through an official of the Mellon National Bank, acting, it is understood, for the Koppers company, a Mellon corporation. No

immediate operation of the tract is anticipated, the purchase being regarded as an investment to increase the Koppers company fuel reserves. This corporation already has large coal holdings in West Virginia and this latest Greene County purchase adjoins the northern limits of the southern field.

S. D. Dimmick and H. M. Warren, general manager and consulting electrical engineer respectively of the Glen Alden Coal Co., are making a visit to England, France, Belgium and Germany, including perhaps the Upper Silesian field. They will return about Sept. 15.

The Lehigh & Wilkes-Barre Coal Co. has started extensive repairs to its breaker at No. 4, Audenried, and when the improvements are completed the No. 5 breaker at Honey Brook will be abandoned. It is planned to handle the coal hauled from Green Mountain at the No. 4 plant. There was not sufficient coal to operate the two breakers.

The Bethel Coal Mining Co., operating Bethel No. 1, at Twin Rocks, near Ebensburg, has resumed operations. William C. Shiffer, of Ebensburg, who has been active in the development of the mining interests in Cambria County, is giving the Bethel mine his personal supervision. The company has signed a contract with the Producers' Coal & Coke Co., of Johnstown, to distribute the output of the mine.

Seward E. Button, president of the Beaver Coal Co. and former chief of the state Department of Mines, announces that he is about to build a new breaker at the mine, which is located near Mountain Grove, to replace the one that was destroyed during the labor outbreak last fall. The contract is already let. The breaker will handle 600 tons or more a day and will be finished Nov. 15.

Refusing to obey an order of the executive board of the United Mine Workers to return to work, miners employed in the Henrietta slope of the Henrietta Coal Mining Co., at Dunlo, Cambria County, who went on a strike on Aug. 16, are still out. A decision to remain out was reached at a meeting of the miners on Sunday, Aug. 24. The miners are attempting to force the company's coal inspector to join the union. Rule No. 29 of the scale agreement exempts coal inspectors and mine foremen from membership in the union.

Plans for reopening the old Neilson colliery workings, located at the southwestern limits of Shamokin borough, reached a definite stage last week when a force of carpenters began placing the shaft head in condition. The abandoned Neilson properties were recently purchased from the J. Langdon estate by the Shamokin Coal Co., a newly organized mining corporation which has just completed the floating of the major portion of a \$1,500,000 bond issue through New York security houses. The present breaker building, which was erected by the old Carbon Creek Coal Co. and subsequently sold under the sheriff's hammer, is to be repaired and will be used temporarily by

the new concern in the preparation of coal. Eventually, however, a large steel breaker is to be erected, it is said. It is reported that officials of the Lehigh Valley Coal Co. are interested in the new mining project and that the Neilson workings may be used ultimately in tapping the rich coal basin owned by the Lehigh company in the Edgewood Park section of Shamokin.

S. E. Van Horn, superintendent of the Olyphant and Eddy Creek collieries of the Hudson Coal Co. for the past fifteen years severed his connections with that company last week. The cause of Mr. Van Horn's leaving was not announced by the company. Mr. Van Horn was at one time assistant to the chief mining engineer of the Hudson company and is widely known in the entire anthracite region.

The Sharon Coke Co. has requested a federal permit to erect a new breaker and a new mooring crib at its mines on the right bank of the Monongahela River, four miles below Grays Landing.

Announcement by the Lehigh Valley Coal Co. of indefinite suspension of operations at the Centralia colliery comes as a severe blow to the populace of that enterprising town. A total of 1,500 men were thrown idle with the closing of the colliery. It is the purpose of the company to completely remodel the old breaker, supplanting it with a more modern structure. The work, it is estimated, will require fully four months.

Another mine in the Uniontown district resumed operation last week when Superintendent J. L. Keck, of the South Union mine of the Jamison interests, sent his first shift of diggers into the pit since the shutdown several months ago. Repairmen were engaged in getting the mine in shape for a week. This was easily accomplished as everything in the mine is less than two years old and in first class condition. During the period of temporary idleness the men have never left the company houses and practically all of the old men will be given employment at once.

The dispute regarding the duties of an engineer at the Cranberry colliery, of the Lehigh Coal & Navigation Co., which resulted in a strike of all employees at the operation following the discharge of the engineer, has been placed in the hands of Joseph J. Walsh, chief of the State Department of Mines. The strike has been in effect several weeks.

UTAH

Utah coal operators mined 364,948 tons during July compared with 355,466 during the same month last year. The figures for July, 1922, were 374,934 and in 1921 278,092.

The Martin Coal Co., of Salt Lake City, has received a contract for 7,700 tons of coal, mixed sizes, to be delivered to the city schools. The price was \$32,985.

The Great Western Coal Mines Co. has received permission from the State Securities Commission to sell 60,000 \$10 shares of preferred stock with a

bonus of ten shares of common stock for each share.

WASHINGTON, D. C.

Receipts of the federal government from bonuses, royalties, and rentals under the law providing for the leasing of mineral rights on the public domain aggregated \$13,627,588 for the fiscal year ending June 30, 1924, according to the Interior Department. The largest receipts were obtained from leasing mineral lands in Wyoming, the amount being \$12,270,322. The second state in the size of receipts was California, with \$957,480. Receipts from other states follow: Montana, \$221,426; Alabama, \$85,460; Utah, \$35,402; Colorado, \$33,513; North Dakota, \$10,587; Washington, \$6,280; New Mexico, \$4,784; Louisiana, \$2,295; South Dakota, \$34.

The U. S. Civil Service Commission announces an open competitive examination for Junior Engineer, to be held throughout the country on Oct. 8, to fill vacancies in the Bureau of Standards, Bureau of Mines, Bureau of Chemistry, and various other branches of the government service, at an entrance salary of \$1,860 a year. Advancement in pay may be made without change in assignment up to \$2,400 a year. For appointment outside of Washington, D. C., it is probable that this same rate of pay will be applicable, but if not, the entrance salary will be from \$1,500 to \$2,000 a year. Full information and application blanks may be obtained from the U. S. Civil Service Commission, Washington, D. C., or the secretary of the board of U. S. civil-service examiners at the post office or custom house in any city.

WEST VIRGINIA

The Jones & Laughlin Steel Co. is reported to have completed preparations for the opening and development of 15,000 acres of coal lands along the Monongahela River, near Dunkard. Operations are expected to begin about Nov. 1.

A deed was filed at Clarksville, Aug. 23, in the office of Clair N. Parish, clerk of the county court, transferring to the Allied Coal Co. a complete mining plant and 79.56 acres of coal in Clay district, Harrison County. The deed includes the mining rights together with all the mining equipment located on the premises and specifically states that the transaction is a sale in gross and not by the acre. Chester S. Shinn, C. H. Tarleton, Mary C. Tarleton, L. A. Riggs, Tusca Morris, Harriet B. Morris, Harry B. Crane, Edna D. Crane, Boyd S. Fleming and Eva B. Fleming, all of Fairmont, are the makers of the deed.

WYOMING

The Union Pacific Coal Co. has ordered a shale dust pulverizing plant from the Williams Patent Pulverizer and Crusher Co. of St. Louis. The plant will pulverize from two to three tons of shale an hour to a texture which will admit of a minimum of ninety per cent of the dust passing through a 200-mesh screen. The plant

is expected to be in operation at Rock Springs before Oct. 1.

CANADA

A meeting of the former employees of the Morden mine, at Nanaimo, was held Aug. 13 to consider the proposal of B. H. Brown and J. Arbuthnot, representatives of the West Coast Collieries, Ltd., that the men take stock in the company instead of the wages due to them, and thus enable the company to re-start work at the mine. The proposition was rejected and the Provincial Minister of Mines and Attorney General were advised of the decision.

A company has been formed to produce coke at St. John, N. B., the capital being largely from the United States. According to tests that have been made Minto coal has proven the most satisfactory. The intention is to build a plant at St. John, before the winter sets in.

The strike of miners in Alberta coal mines has caused a direct wage loss to the miners of something like \$2,500,000 in the four months, according to an estimate of John F. Stirling, chief inspector of mines for Alberta, based on the loss in coal production as compared with the same four months in 1923.

The Allan shaft will be reopened soon, according to representatives of the Dominion Coal Co. On June 30 an explosion occurred in this mine causing the loss of four lives. Following the explosion, a fire occurred which raged for about six weeks. An inspection of the mine recently by agents of the company in conjunction with representatives of the provincial government indicated that the fire had been extinguished by the company's fire fighters. T. J. Brown, Deputy Minister of Mines, has given his approval of the decision to reopen.

Industrial Notes

The General Explosives Co., of Joplin, Mo., has been acquired by the DuPont Powder Co.

The Mine Safety Appliance Co., Pittsburgh, Pa., has entered into an agreement whereby that company becomes exclusive representative of the Bradley Pulverizer Co., Allentown, Pa., for the distribution of the latter's mills for pulverizing shale and limestone for rock-dusting purposes.

Important changes in the personnel and policies of the Bassick-Alemite Corporation and its subsidiaries are announced as a result of a recent meeting of the Board of Directors in New York. The Bassick-Alemite Corporation has purchased the Allyne-Zerk Co., which will be operated as an independent unit but under the same general management as the other units that make up the corporation. E. W. Bassick, of Bridgeport, Conn., as president of the corporation will take a more active part in the management of its affairs in the future. The general direction of the properties will be in the hands of an executive committee, headed by Mr. Bassick and including E. S. Evans, E. E. Allyne and James G. Alexander, vice-president of the Central Trust Co., Chicago. E. S. Evans, president of E. S. Evans & Co., a subsidiary, becomes vice-president of the Bassick-Alemite Corporation in charge of sales of all units of the corporation, including the Bassick Manufacturing Co., of Chicago, manufacturers of the Alemite High Pressure lubricating system, and the Allyne-Zerk Co., manufacturers of the Allyne-Zerk lubricating system.

Traffic News

Railroads to Fight Interstate Rate Cut to East St. Louis

Counsel for the thirteen railroads serving the inner group of coal mines adjacent to East St. Louis, Ill., have announced that an appeal will be taken from the recent decision of Circuit Judge George A. Crow, of Belleville, Ill., who on Aug. 15 declined to stay the order of the Illinois Commerce Commission reducing the intrastate freight rate on coal shipments to East St. Louis. Under the Illinois commission's ruling the rate on mines within 30 miles of East St. Louis was cut from 91c. to 70c. per ton while the rate on other miles of the inner group was reduced from 91c. to 80c. The case will go to the Illinois Supreme Court.

Protests Coke Rates to Mobile

The Chamber of Commerce of Mobile, through its traffic department, has filed protest against the recently published rates on coke from points in Tennessee and Georgia to Mobile for export movement, alleging that such rates are unjustly discriminatory against Mobile and preferential to South Atlantic coast points, and asking a suspension of the tariff which was to have become effective Aug. 28.

South Dakota Cuts Rates

The State Railroad Commission of South Dakota announces a general reduction of freight rates on steam coal to numerous points in that state, at the same time that rates from South Dakota to southern Minnesota points are increased under the ruling of the Interstate Commerce Commission. The change is effective Sept. 10 and affects many points in South Dakota. Watertown gets a reduction from \$4.32 to \$3.92; Huron from \$4.74 to \$4.31; Miller from \$5.10 for both steam and lump to \$4.95 on lump and \$4.51 on steam; Mobridge from \$6.16 on all sizes to \$5.29 on lump and \$4.86 on steam. Numerous other towns get similar reductions. Railroads serving the Lake Superior docks have made cuts of 40c. to a number of South Dakota points.

Association Activities

The Central West Virginia Coal Operators Association was formed by a group of operators with open-shop mines in the Harrison County field of West Virginia at a preliminary meeting held at the Waldo Hotel in Clarksburg, W. Va. J. M. Orr, H. G. Smith, T. R. Craig, James Dudley and J. P. Keeley were named as members of a committee to apply for a charter, which was granted on Saturday, Aug. 23. Daniel Howard presided over the meeting, T. R. Craig acting as secretary. Approximately 25 operators enrolled as members, representing about 60 per cent of the tonnage produced in the Harrison County field. A committee was appointed at the first meeting to draft a set of by-laws and there will be another meeting soon to elect directors and officers.

Fred S. McConnell, of Cleveland, vice-president of the Enos Coal Mining Co., was elected president of the Indiana Coal Producers' Association, at the annual meeting held recently in Indianapolis. Hugh B. Lee, of Terre Haute, general manager of the Maumee Collieries Co., was elected

vice-president, and Michael Scollard, also of Terre Haute, is secretary-treasurer. The executive board is composed of the following: J. T. Moorman, president and general manager, Patoka Coal Co., Indianapolis; Wick Dixon, general manager, Modern Fourth Vein Coal Co., Jasonville, Ind.; R. H. Sherwood, president, Sherwood Coal Co., Indianapolis.

Trade Literature

Static Condensers for Power-Factor Correction. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Circular 1670. Pp. 20; 8x11 in.; illustrated. Discusses need for power-factor correction and methods of obtaining high power factor. Analyzes method of selecting proper corrective device for power factor.

The Mesta Machine Co., Pittsburgh, Pa. has issued a four-page folder giving results of tests with its **Una-Flow Engines**. A short illustrated description of these engines is also included.

Westinghouse Fabrics and Papers. The Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa. Folder 4532-A. Pp. 23; 4x7 in. This booklet should prove useful to all users of insulating material.

Okonite Installations. The Okonite Co., Passaic, N. J. Pp. 32; 9x12 in. This finely illustrated booklet is composed of views showing railroad and power installations of Okonite wires and cables.

The Ridgway Dynamo & Engine Co., Ridgway, Pa., recently issued Bulletin No. 21, which supersedes Bulletin No. 28, describing its turbo generator units. The bulletin is well illustrated with photographs and line drawings, has 27 pp. and measures 8x10½ in.

The Improved "Rechlitz" Automatic Water Still. Weber Bros. Metal Works, 108 North Jefferson St., Chicago, Ill. Pp. 8; 5½x8½ in.; illustrated. A combined condenser, purifier and aerator for producing a pure and palatable water for drinking and manufacturing purposes.

Obituary

Bushrod M. Watts, formerly president of the Baltimore Coal Exchange and one of the best known figures in the retail coal trade of the East, died in Baltimore, Aug. 27 as a result of an attack of pneumonia. Mr. Watts had not been in the best of health for some years.

James LeRoy Cook, prominently identified with the coal industry of Salt Lake City as a sales manager for several years, is dead, following an acute attack of rheumatism of the heart. Mr. Cook was at one time associated with the United States Fuel Co., but at the time of his death was sales manager for the Kinney Coal Co. He was only 35 years of age.

Coming Meetings

New York State Coal Merchants Association, Inc. 14th annual convention, Sept. 4-6, Stamford-in-the-Catskills, N. Y.; headquarters Churchill Hall. Executive secretary, G. W. F. Woodside, Arkay Building, Albany, N. Y.

American Chemical Society. Fall convention Sept. 8-11, 1924, at Ithaca, N. Y. Secretary, Gas and Fuel Section, O. O. Malleis, the Koppers Co., Pittsburgh, Pa.

Oklahoma Coal Operators' Association. Annual meeting Sept. 11, 1924, McAlester, Okla. Secretary, A. C. Casey, McAlester, Okla.

Association of Iron and Steel Electrical Engineers. Annual meeting and exposition at Duquesne Garden, Pittsburgh, Pa., Sept. 15-20. Secretary, John F. Kelly, 1007 Empire Bldg., Pittsburgh, Pa.

National Safety Council. Thirteenth annual safety congress Sept. 29 to Oct. 3, Louisville, Ky. Managing director and secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

American Institute of Mining and Metallurgical Engineers. Fall meeting, Birmingham, Ala., Oct. 13-15. Secretary, F. F. Sharpless, 29 West 39th St., New York City.

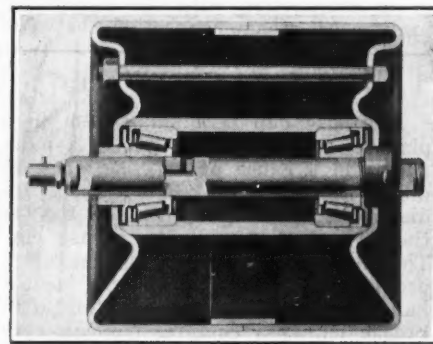
American Institute of Electrical Engineers. Fall convention, Pasadena, Calif., Oct. 13-17. Secretary, F. L. Hutchinson, 29 West 39th St., New York City.

New Equipment

Belt-Conveyor Carrier with Pressed-Steel Shell

Improvements to its belt-conveyor carriers have been announced by the Stearns Conveyor Co., of Cleveland. The pulley shell is made of pressed steel which, as compared with a cast-iron shell, has the advantages of lighter weight, greater strength, and better balance. The rounded edges prevent injury to the belt.

Antifriction bearings are used between the hardened steel shaft and the



Cutaway Section of Carrier

The one-piece tube which forms the grease chamber is firmly held by the tapered ends of the pressed-steel shell.

one-piece tube which is held firmly in the tapered ends. Grease is forced by high pressure into the large chamber between the shaft and shell, and it is claimed that one filling is sufficient for a period of from six to twelve months. The design is such as to prevent dust from entering the bearings and to make it difficult for any foreign substances to accumulate on the outside of the pulley.

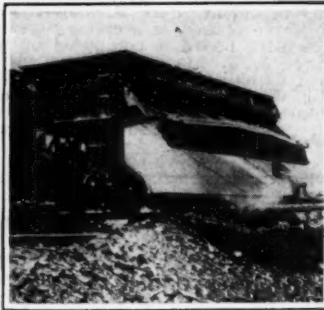
The advantages claimed are: Saving of power; increased life of belts and carriers; reduced costs of lubrication, inspection and maintenance; and more continuous service.

Dump Car Operated by Steam From Locomotive

Recently an interesting type of automatic dump car was placed in service handling breaker refuse at the mines of the East Bear Ridge Colliery Co., Mahanoy Plane, Pa., in the anthracite region.

The side-door dump is operated by cylinders supplied with steam from the locomotive and is fully controlled by a single valve in the locomotive cab. If desired the dumping may be done while the car is in motion, the design being such that the material is deposited clear of the track.

This long type of dump car is of rugged steel construction and is designed with a low center of gravity. The car has a capacity of 20 tons and its overall dimensions are as follows: Length 16 ft., width 8 ft., height 7 ft. The bottom has a 45-deg. pitch and the track gage of this particular in-



Locomotive Supplies Steam to Operate Dump

The latching and unlatching as well as the opening and closing of the dump are controlled by one valve in the locomotive cab. The material is deposited several feet from the track.

stallation measures 36 in. Not only is provision made for braking by hand but a steam brake is provided which can be operated either independently, or in conjunction with the locomotive brake. All steam connections between

the car and locomotive are of flexible brass tubing, and the steam lines are cleared of water by automatic traps. The Bloomsburg Locomotive Works, of Bloomsburg, Pa., is the designer and builder of this car.

Improved Grease Cup

A grease cup is a small item in a plant or factory, but it can be a nuisance and a cause of expense. Recognizing this, the Link-Belt Co., of Indianapolis, has developed a new top for their regular compression grease cup. This top is hexagonal in shape, which provides not only a good grip for the hand but also for a wrench. Cold, stiff grease makes a compression cup very hard to turn, and a pipe wrench is not always accessible. The hexagonal shape provides grip spaces for the ordinary wrench.

This cup is also provided with a raised slot so that it can be turned with a screwdriver, when it is so located that it is inconvenient for the hand or wrench.

Loading Machine with Tread Similar to War Tank

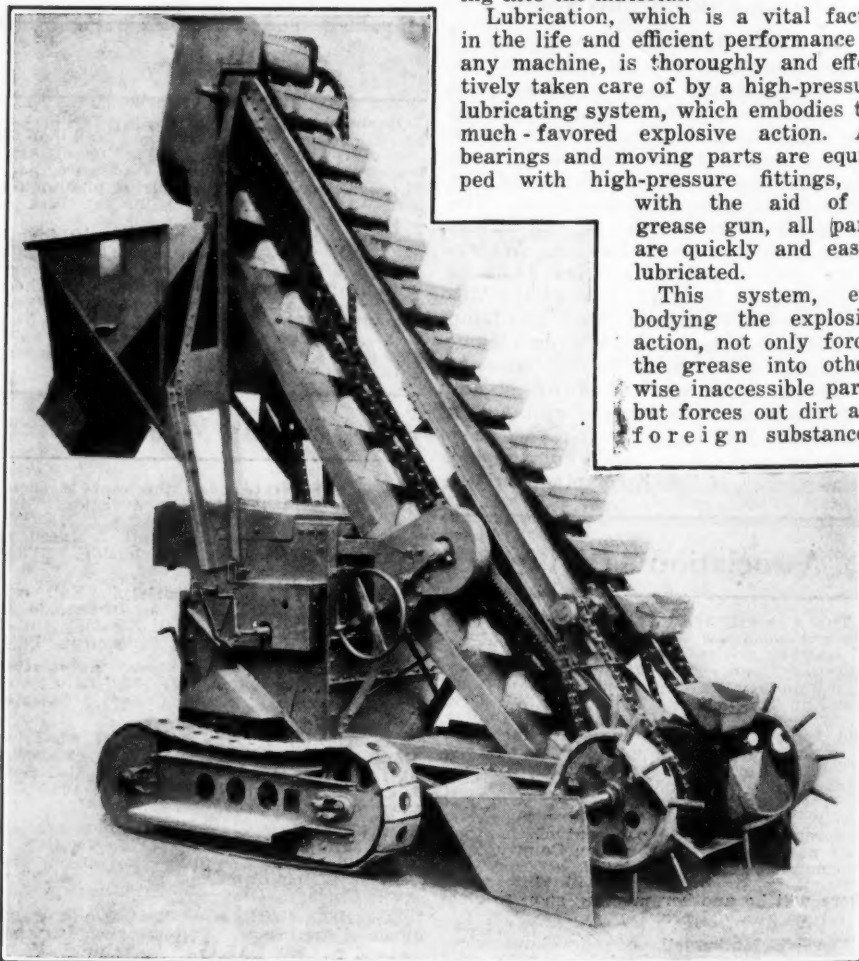
A new portable loading device of the bucket type suitable for moving over soft, rough or uneven ground has been developed lately by the Jeffrey Manufacturing Co. This new machine, known as the Tanktred Loader, has an elevator boom designed along lines similar to the radial loader boom, but the three-wheel chassis is replaced by a tanktred crawler mounting, and the lower end of the boom is fitted with an effective clean-up device and scoop.

The loader has a capacity of $1\frac{1}{2}$ to 2 cu.yd. per minute and will handle rough material. The framework of this member is built up of wood and steel to provide great strength and elasticity. Two strands of Hercules chain are used to carry the buckets. The latter are 18 in. long, of malleable iron, with high backs and renewable steel-digger edges. To receive the discharge from the elevator buckets, the top of the boom may be fitted with a swivel spout, to give as much as 11 ft. clearance from the ground. Or, in place of the swivel spout, a measuring, or batch hopper, with valve in the bottom, and having a capacity of about 21 cu.ft., may be substituted.

The tread proper consists of heavy steel plates, bolted to a chain made of cast-steel side bars, hardened steel knuckles and hardened steel pins. The

tread sprockets are heavy cast steel. The thrust from the under side of the tread is taken by chilled rollers, placed in proper position. The main weight of the machine is carried on these crawlers by a three-point suspension, to take care of rough and uneven ground.

The clean-up device consists of revolving spiders, having hardened-steel pin inserts and a plate-steel scoop. The heavy cast-iron spiders are brass-bushed and revolve on the extension of



Loader for Traveling Over Rough or Soft Ground

Control levers on the differential shaft are used to turn the machine either on the pivot wheel or the center of either crawler. High-pressure lubrication is applied to all bearings.

the foot shaft to and through the scoop to the body of the machine. The steel-pin inserts are so placed as to loosen thoroughly compact material and carry it forward into the path of the buckets.

All the driving mechanism is mounted in a rigid steel and cast-iron, self-contained frame, which in turn is mounted on the framework proper of the machine. A heavy steel shelf supports the power unit so that all gears are in line and cannot get out of proper mesh. All gears are steel with cut teeth and the bearings are bronze-bushed and grease-oiled, which keeps out the dirt.

Operation is easily controlled by levers conveniently located and easily reached by a man standing on the platform which is attached to one of the tread frames. Each function of the machine is completely independent of the other. Propelling, steering and operation of the elevator are accomplished through multiple-disk clutches.

The treads are controlled by brake mechanism on the differential shaft, making it possible to turn the machine on the center of either crawler as a pivot. The raising and lowering device is self-retained and automatically locks in any position. Provision is made for two speeds, both in the forward and reverse direction: The fast speed, 50 ft. per minute, for moving the machine from pile to pile, the slow speed, about 2 ft. per minute, for feeding into the material.

Lubrication, which is a vital factor in the life and efficient performance of any machine, is thoroughly and effectively taken care of by a high-pressure lubricating system, which embodies the much-favored explosive action. All bearings and moving parts are equipped with high-pressure fittings, so with the aid of a grease gun, all parts are quickly and easily lubricated.

This system, embodying the explosive action, not only forces the grease into otherwise inaccessible parts, but forces out dirt and foreign substances.